MDS-501

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
Singapore Model
Tourist Model

Model Name Using Similar Mechanism	MDS-101
Mechanism Type	MDM-1C
Base Unit Type	MBU-1A
Optical Pickup Block Type	KMS-140B

SPECIFICATIONS

MD recorder section

System	MiniDisc digital audio system
Disc	MiniDisc
Laser:	Semiconductor laser
Wavelength:	780 – 790nm
Laser diode properties	Material: GaAlAs Emission duration: continuous Laser output: less than 44.6 μW (This output is the value measured at a distance of 200 mm from the lens surface on the optical pick-up block.)
Revolutions	400 rpm to 900 rpm (CLV)
Error correction	Advanced Cross Interleave Reed Solomon Code (ACIRC)
Sampling frequency	44.1 kHz
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ± 0.5 dB
Signal-to-noise ratio	More than 98 dB (during playback)
Wow and flutter	Below measurable limit

Inputs

	Jack type	Input impedance	Rated input	Minimum input
MIC ＊1	Phone jack	600 ohms	0.8 mVrms	0.25 mVrms
LINE IN	Phono jack	More than 47 kilohms	500 mVrms	158 mVrms
DIGITAL IN	Square optical connector jack	Optical wave lenghth 660 nm	—	—

＊1: Except US, Canadian model only

—Continued on next page—

使用時は添付資料も参照のこと
Refer to the additional documents.

MINIDISC RECORDER

SONY®

Outputs

	Jack type	Rated output	Load impedance
PHONES	Stereo phone jack	28 mW	32 ohms
LINE OUT	Phono jack	2 Vrms at a load impedance of 50 kilohms	More than 10 kilohms
DIGITAL OUT	Square optical connector jack	–18 dBm	Optical wave lenghth 660 nm

General

Power requirements: 120V AC, 60Hz: US, Canadian model
220–230V AC, 50/60Hz: AEP model
240V AC, 50Hz: UK model
110–120V/220–240V AC adjustable, 50/60Hz: Singapore, Tourist model

Power consumption: 19W: US, Canadian model
24W: AEP, UK, Singapore, Tourist model

Dimensions: Approx 430 × 85 × 355 mm (w/h/d)
(17 × 3 3/8 × 14 inches) incl. projecting parts

Mass: Approx 5.2 kg (11 lb 7 oz)

Supplied accessories

- Remote commander RM-D1M (1)
- Sony SUM-3 (NS) batteries (2)
- Audio connecting cords (pin-jack × 2 ↔ pin-jack × 2) (2)
- Optical cable (1)

Design and specifications are subject to change without notice.

U.S. and foreign patents licensed from Dolby Laboratories Licensing Corporation.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

TABLE OF CONTENTS

Section — Title — Page

1. GENERAL 4
2. DISASSEMBLY
   - 2-1. Case, Front Panel 27
   - 2-2. Front Panel 27
   - 2-3. Back Panel 28
   - 2-4. Power Trans, Digital·AU Board 28
   - 2-5. Mechanism Deck (MDM-1C) 29
   - 2-6. RF Board 29
   - 2-7. Base Unit (MBU-1A) 30
   - 2-8. Loading Motor Assy 30
   - 2-9. Sled Motor 31
   - 2-10. Mini Disc Device (KMS-140B) 31
3. TEST MODE 32
4. ELECTRICAL ADJUSTMENTS 34
5. DIAGRAMS
   - 5-1. IC Pin Functions
     - •IC103 EFM/ACIRC Encoder/Decoder (CXD2525R) 43
     - •IC110 Shock Proof Memory Controller (CXD2526AR) 45
     - •IC111 System Control Microprocessor (M38067MC-070FP) 47
     - •IC260 Sampling Rate Converter (CXD8482Q) (AEP, UK, Singapore, Tourist model only) 49
     - •IC301 Master Microprocessor (M38197MA-071FP) 50
   - 5-2. Block Diagram 51
   - 5-3. Circuit Boards Location 56
   - 5-4. Printed Wiring Boards —RF/Servo Section— 58
   - 5-5. Schematic Diagram —RF/Servo Section— 61
   - 5-6. Schematic Diagram —Digital, A/D, D/A Section— 66
   - 5-7. Printed Wiring Board —Digital, A/D, D/A Section— 71
   - 5-8. Schematic Diagram —Audio/Power Supply Section— 76
   - 5-9. Printed Wiring Boards —Audio/Power Supply Section— 79
   - 5-10. Printed Wiring Boards —Display Section— 82
   - 5-11. Schematic Diagram —Display Section— 85
   - 5-12. Semiconductor Lead Layouts 88
6. EXPLODED VIEWS
   - 6-1. Cabinet Section 90
   - 6-2. Chassis Section 91
   - 6-3. Mechanism Deck Section-1 (MDM-1C) 92
   - 6-4. Mechanism Deck Section-2 (Slider Assy) (MDM-1C) 93
   - 6-5. Base Unit Section (MBU-1) 94
7. ELECTRICAL PARTS LIST 95

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

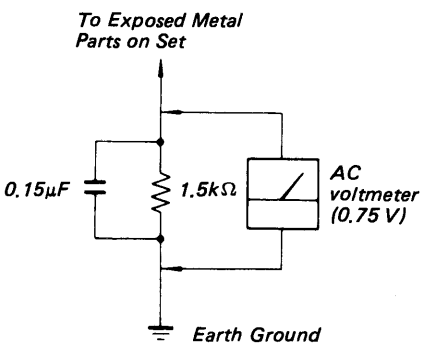
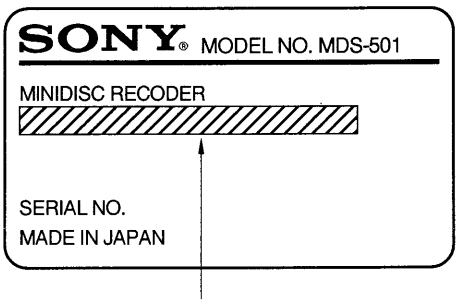


Fig. A. Using an AC voltmeter to check AC leakage.

MODEL IDENTIFICATION

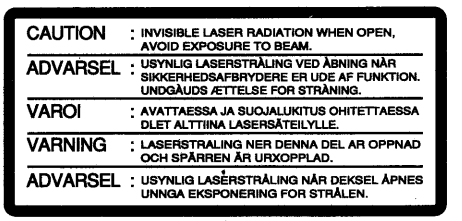
— Specification Labels —



US, Canadian model : AC: 120V 60Hz 19W
AEP model : AC: 220—230V~50/60Hz 24W
UK model : AC: 240V~50/60Hz
Singapore, Tourist model : AC: 110—120/220—240V~50/60Hz 24W

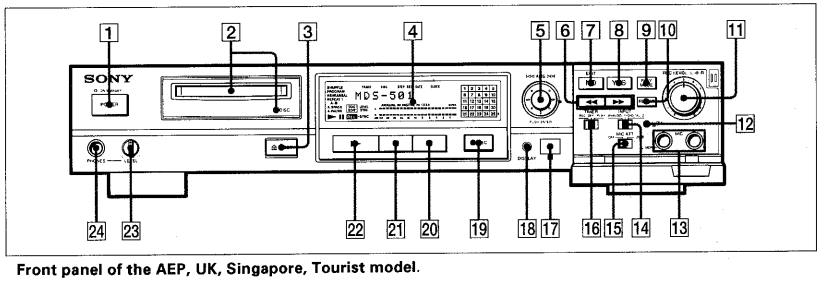
This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

The following caution label is located inside of the unit.


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅUDS ÆTTELSE FOR STRÅNING.
VAROI : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA DLET ALTTIINA LASERSÄTEILYLLE.
VARNING : LASERSTRALING NER DENNA DEL AR OPPNAD OCH SPÄRREN ÄR URXOPPLAD.
ADVARSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGA EKSPONERING FOR STRÅLEN.

Looking at the Controls

Front panel



Front panel of the AEP, UK, Singapore, Tourist model.

1 **POWER switch and STANDBY indicator**
Press to turn on the recorder. The indicator lights up green. Press again to change to stand-by. The indicator lights up red.

2 **Disc compartment and DISC indicator**
Insert a disc here for automatic loading. The indicator lights up orange after a disc is loaded.

3 **⏏ EJECT button**
Press to eject the disc from the disc compartment.

4 **Display window**
Indicates the current operating status.

5 **AMS* dial**
Turn to cue to the beginning of specific tracks, set the clock, specify the playing order of programmed tracks, edit functions, and enter text data. Press to play or pause an MD.

6 **◀◀ ▶▶ (search) buttons**
Press to find a specific point within a track.

7 **EDIT/NO button**
Press to specify or cancel editing functions. Press during recording or recording pause to specify the track number recording method.

8 **YES button**
Press to perform editing functions (i.e., erasing, dividing, combining, and moving).

9 **PLAY MODE button**
Press to select playback modes (i.e., CONTINUE, SHUFFLE, and PROGRAM).

10 **REPEAT button**
Press for repeated playback.

11 **REC (recording) LEVEL control**
Turn to adjust the recording level when recording from analog sources. The outer knob controls the L (left) channel level and the inner knob the R (right) channel level. You can turn both knobs together, or independently by holding one while turning the other. Recording level adjustment is unnecessary when recording from a digital source.

12 **CLOCK SET button**
Press to set the clock.

13 **MIC (microphone) jacks (Except US, Canadian model only)**
Insert microphones into these jacks. Use two microphones for stereo recording. For monaural recording, connect a single microphone to the left-channel jack. The same signal is recorded to both channels.

14 **INPUT selector switch**
Use to select the input signal source.
ANALOG: Selects the signal source connected to the LINE IN (line input) jacks.
DIGITAL 1: Selects the signal source connected to the DIGITAL IN 1 jacks.
DIGITAL 2: Selects the signal source connected to the DIGITAL IN 2 jacks.

15 **MIC (microphone) ATT (attenuation) switch (Except US, Canadian model only)**
Set to –20 dB to attenuate excessively strong signals when recording with a microphone.

16 **TIMER switch**
Set normally to OFF. Set to REC or PLAY when using an optional timer to record or playback at preset times.

17 **Remote sensor**
Accepts commands from the remote commander.

18 **DISPLAY button**
Press to display the title of the current track and the remaining playing time on the MD.

19 **● REC (record) button**
Press once for recording pause. Press ▶ or ❚❚ to start recording. Use also for track marking.

20 **■ (stop) button**
Press to stop playback or recording, or to erase all programmed tracks.

21 **❚❚ (pause) button**
Press during playback or recording to pause the recorder; press again to cancel pause.

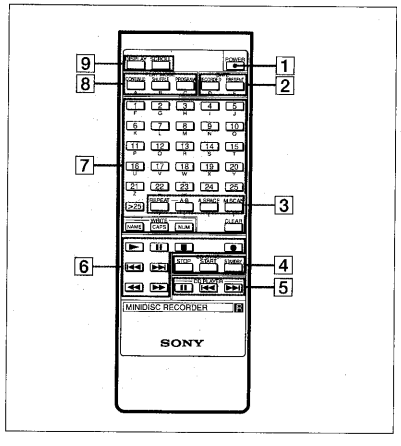
22 **▶ (play) button**
Press to start playback or recording.

23 **LEVEL control**
Turn to adjust the volume of the headphones.

24 **PHONES jack**
Connect headphones with a stereo phone plug here.

* AMS: Automatic Music Sensor

Remote commander



1 **POWER switch**
Press to turn on the unit; press again to turn off (change to stand-by).

2 **DATE buttons**
DATE RECORDED button
Press to display the recording date of a track during playback.
DATE PRESENT button
Press to display the current time and date.

3 **REPEAT/A.SPACE/M.SCAN buttons**
REPEAT button
Press for repeated playback.
A-B button
Press for repeated playback of specific portions of a track.
A (auto).SPACE button
Press once for automatic insertion of 3-second blank spaces between tracks during playback (auto space function).
Press twice for automatic pausing after each track during playback (auto pause function).
M (music).SCAN button
Press to scan the beginning of each track in succession.

4 **CD-SYNC. operation buttons**
(use for synchronized recording with a Sony CD player)
STANDBY button
Press to activate recording pause prior to CD synchro recording.
START button
Press to start CD synchro recording.
STOP button
Press to stop CD synchro recording.

5 **CD PLAYER operation buttons**
(Use to control Sony CD players)
❚❚ (pause) button
Press to pause playback; press again to resume playback.
⏮ ⏭ (AMS) buttons
Press to find the beginning of a track.

6 **Operation buttons**
▶ (play) button
Press to start playback or recording.
❚❚ (pause) button
Press during playback or recording to pause the recorder; press again to cancel pause.
■ (stop) button
Press to stop playback or recording, or to erase programmed tracks.
● (record) button
Press once for recording pause. Press ▶ or ❚❚ to start recording. Use also for track marking.
⏮ ⏭ (AMS) buttons
Press to find the beginning of specific tracks.
◀◀ ▶▶ (search) buttons
Press to find a specific point within a track.

7 **Character/Numeric buttons**
Alphabet/Numeric buttons
Use to specify tracks for immediate playback or to create programs during program play. Use also for entering disc and track titles.
WRITE/CAPS, WRITE/NUM buttons
Press to select the character mode.
WRITE/NAME button
Press to add a title.
CLEAR button
Press to erase a track title, disc title or programmed track.

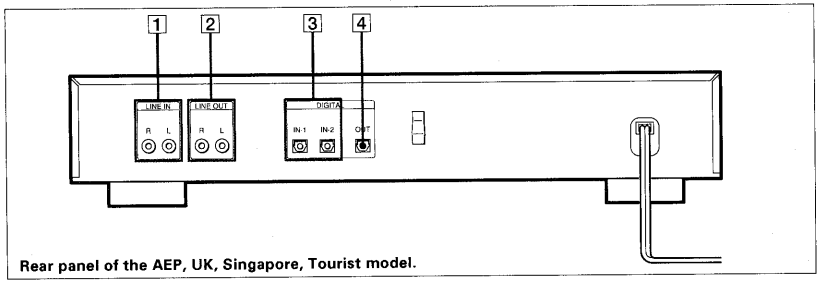
8 **PLAY MODE buttons**
Press to select the playback mode (i.e., CONTINUE, SHUFFLE, or PROGRAM).

9 **Display buttons**
DISPLAY button
Press to display the track title or the remaining playing time during MD playback.
SCROLL button
Press to scroll titles longer than 12 characters. Press to pause scrolling.

Hooking Up the System

See below for an explanation of the MDS-501's analog and digital jacks. See pages 11(E) and 12(E) for system connection examples.

Rear panel jacks



Rear panel of the AEP, UK, Singapore, Tourist model.

1 LINE IN (line input) jacks (phono jack)
Connect to the REC OUT (recording output) of the amplifier used as a signal source for analog recording.

2 LINE OUT (line output) jacks (phono jack)
Connect to the TAPE (tape input) of an amplifier for analog signal output to speakers.

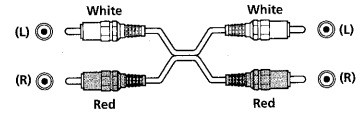
3 DIGITAL IN 1/DIGITAL IN 2 jack (optical jack)
Connect to the digital output jack of a digital signal source, such as an amplifier with a built-in D/A converter, CD player, DAT deck, BS tuner, or another MD recorder. Specify DIGITAL 1 or 2 with the INPUT selector switch for digital recording from the respective source.

4 DIGITAL OUT jack (optical jack)
Connect to the digital input jack of an amplifier with a built-in D/A converter for signal output on speakers, or a DAT deck or another MD recorder for digital recording.

Before you begin

- Turn off the power to all the equipment to be connected before making any connections.
- Note that the red plug of the supplied audio connecting cord is for right-channel (R) connection and the white plug for left-channel (L) connection. If another connecting cord is necessary, use the optional RK-C515HG cord.
- Insert the connecting cords fully into the jacks. A loose connection may cause hum pickup.
- Pull out the cords by grasping the plug, not the wire.

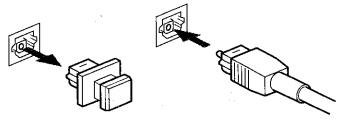
Connecting the audio connecting cords



Notes on the optical digital input/output jacks

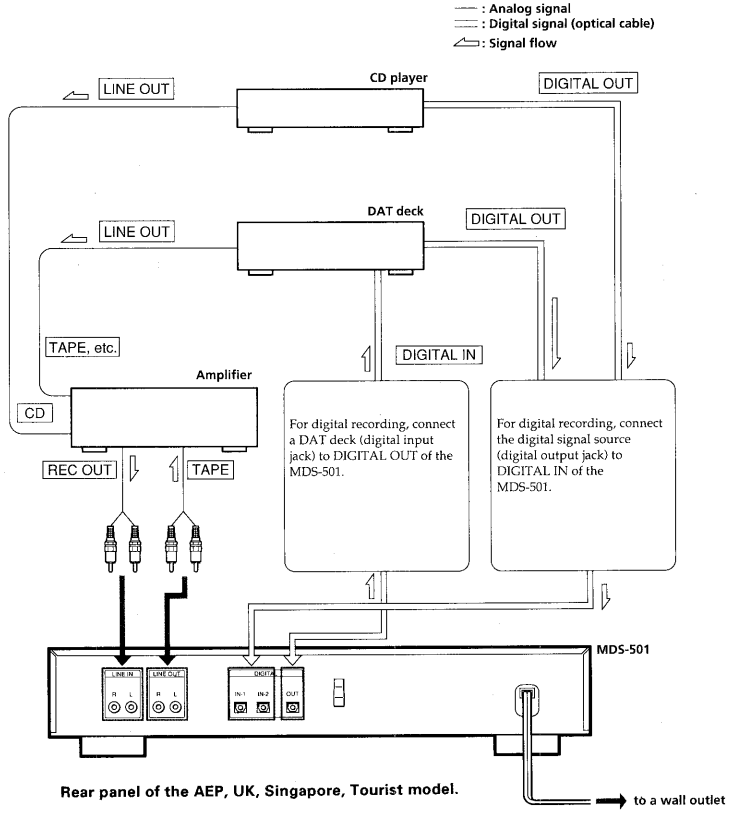
Use the supplied optical cable to connect digital devices (i.e., DAT decks, amplifiers with digital inputs, or DA converter units, etc.) to the optical digital input and output jacks. Recording level adjustment is not necessary when recording through the optical cable from a digital source since the output level is fixed.

Connecting the optical cable



Remove the plug. Insert the cable firmly.

Hooking up an analog-signal amplifier



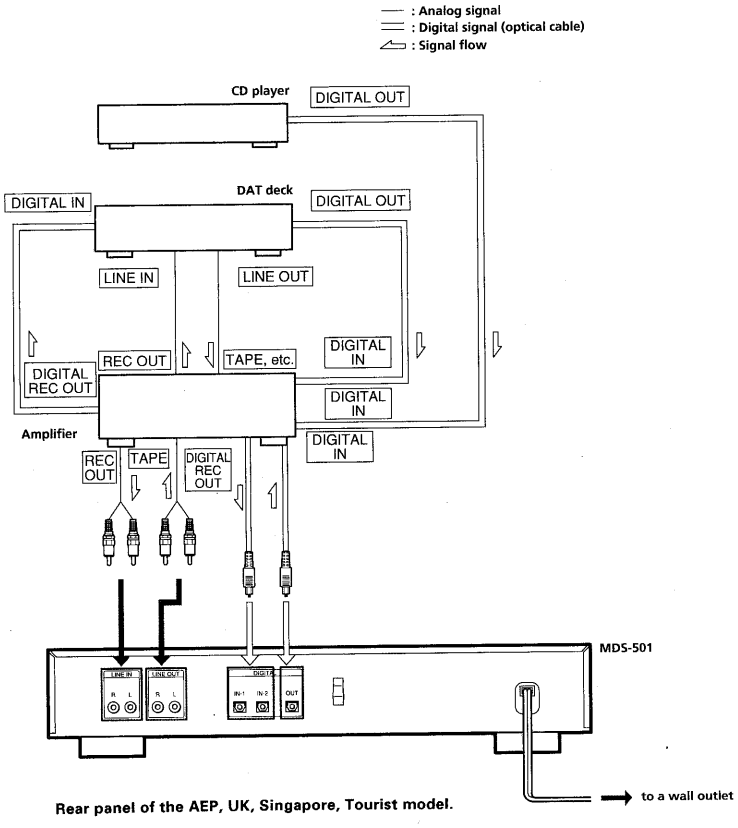
Rear panel of the AEP, UK, Singapore, Tourist model.

To connect a microphone
Connect the microphone jack to the MIC jack of the front panel.

Note
If "Cannot Copy" appears in the display window, recording through the digital jack is not possible.
In this case, connect the signal source through the LINE IN and OUT jacks.

Hooking up the System

Hooking up a digital-signal amplifier



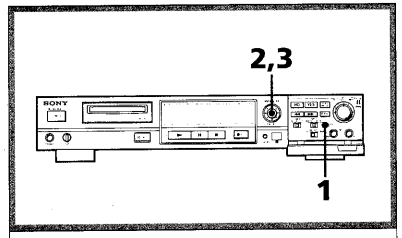
Rear panel of the AEP, UK, Singapore, Tourist model.

Note
If "Cannot Copy" appears in the display window, recording through the digital jack is not possible.
In this case, connect the signal source through the LINE IN and OUT jacks.

Setting the Clock

By setting the clock, the time and date of all recordings will be automatically written to the MD. When you play back a recorded track, you can display the date and time of the recording in the display window.
For more precise time and date stamping of recordings, we recommend that you set the clock at least once a week.

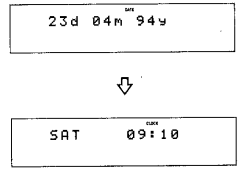
Example: Setting the clock to 9:10 AM, April 23, 1994.



1 Hold down CLOCK SET for about 2 seconds until the year starts to flash.

2 Turn the AMS dial to enter the year, month, day, hour, and minute.
Press the AMS dial after entering each item.

3 After setting the minutes, press the AMS dial in synchronization with a time signal.



The clock setting proceeds in order of date, then time.

Notes

To change the time and/or date
1 In step 2, press the AMS dial until the item to be changed flashes.
2 Turn the AMS dial to change the value.
3 Complete the setting by pressing CLOCK SET or the AMS dial until all items stop flashing.

To display the current date and time
Press CLOCK SET on the front panel once to display the date, then again to display the time. When using the remote commander, press DATE PRESENT. The date appears, followed by the time.

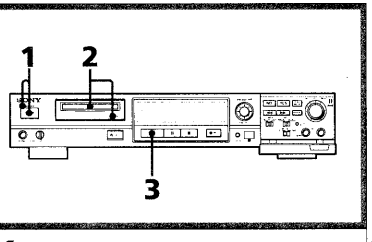
Changing the display mode while the recorder is off
Press DISPLAY to choose either no display or display of the current time.

When the power cord is unplugged for a long time
The memorized settings are lost, and "STANDBY" flashes when you plug in and turn on the recorder again. If this happens, set the clock again.

Playing an MD (Normal Play)

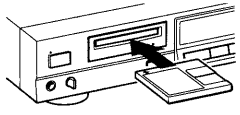
You can play back an MD in two ways:
- Playing from the first track
- Playing from a specific track

Playing an MD from the first track

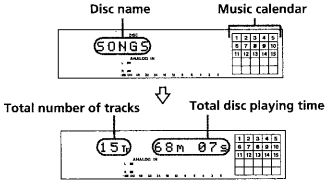


1 Press POWER to turn on the recorder.
The STANDBY indicator changes from red to green.

2 With the label side up and the arrow pointing toward the opening, slide the MD into the disc compartment until the recorder grips it.
If you insert the MD while the recorder is off, the recorder will turn on automatically.
The DISC indicator lights up.

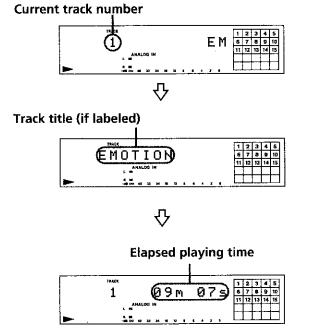


The disc name appears, followed by the total number of tracks (Tr) and total disc playing time. A music calendar showing all the track numbers appears within a grid if the MD is a premastered disc, or without a grid if the MD is a recordable disc.
If the total track number exceeds 25, ▸ appears to the right of number 25 in the music calendar.



3 Press ► or the AMS dial.
The MD starts playing.

The current track number, track title (if labeled), and elapsed playing time of the current track light up in the display window.



To pause playback
Press ❚❚ or the AMS dial.
To restart playback, press ► or ❚❚ or the AMS dial again.

To stop play
Press ■ .

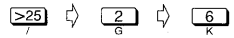
To eject the disc
Press ⏏ EJECT.

Locating a specific track

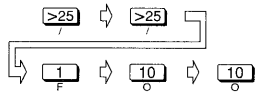
Enter the number of the track on the remote commander. The specified track will begin playing immediately.

Example: To play back the third track

Example: To play back the 26th track

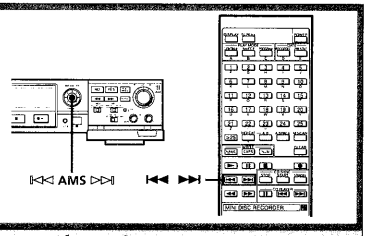


Example: To play back the 100th track



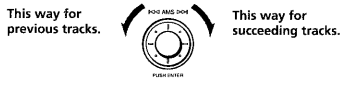
Locating the beginning of a track (AMS)

The AMS function allows you to go quickly to the beginning of a track by merely specifying its number in the display window.



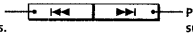
Front panel operation

Turn the AMS dial.



Remote commander operation

Press I◄◄ or ►►I .



Hold down each button to go to successive tracks in the respective direction.

To locate the beginning of the current track
Press I◄◄ once.

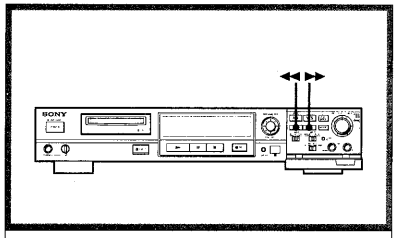
To pause playback at the beginning of a track
Turn the AMS dial (or press I◄◄ or ►►I) after pausing playback.

To go quickly to the beginning of the last track
Turn the AMS dial counterclockwise (or press I◄◄) immediately after inserting the MD.

Playing an MD (Normal Play)

Locating a position within a track (Search)

Use the search function to quickly scan a track either forward or backward during playback to locate a specific position.



To forward scan a track
Hold down ▶▶ during playback.

To backward scan a track
Hold down ◀◀ during playback.

When you release the button, the recorder begins playing from the position located by scanning.

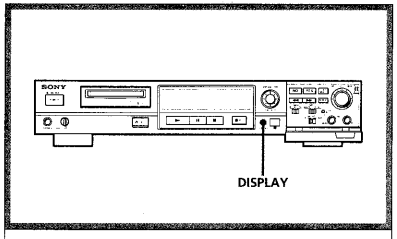
To go forward or backward quickly
Hold down ▶▶ or ◀◀ during playback pause. The recorder scans the disc at 160 times the normal playing speed. Since no sound is output at this time, you must keep track of the disc location through the information that appears in the display window.

Note

Tracks that are only a few seconds in length way be too short to scan using the search funcion. For such tracks, it is better to play the MD back at normal speed.

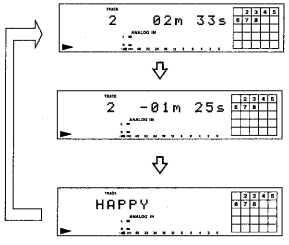
Displaying the title and remaining playing time of a track

Press DISPLAY during playback to display the title and remaining playing time of the current track. "No Name" appears if a track is unlabeled. To label a recordable disc and its tracks, see "Labeling Recordings" on page 43(E).



Press DISPLAY while playing back a track.

Each press of DISPLAY changes the display in the following order: remaining track playing time → track name → elapsed playing time

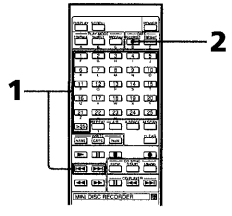


- The display window shows up to 12 characters at a time. To see a title of 13 characters or more, press SCROLL on the remote commander.
  Press SCROLL again to pause scrolling, and again to continue scrolling.
- If no title is recorded, "No Name" appears, followed by the elapsed playing time.
- Each press of DISPLAY while the recorder is stopped changes the display in the following order:
  For premastered discs: Total disc playing time → disc name
  For recorded discs: Total recorded time → remaining disc playing time → disc name

Displaying the recording date

Once you've set the built-in clock, the recorder will automatically record the recording date and time of all tracks. Do the following procedure to display the recording information during playback.

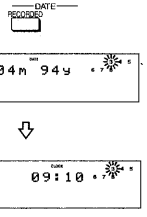
Remote commander operation only



1 Locate the track.
Press ⏮ or ⏭ while the recorder is stopped to locate the track.

If the recorder is playing or paused, enter the track number with the numeric buttons, or keep pressing ⏮ or ⏭ until the number of the track appears.

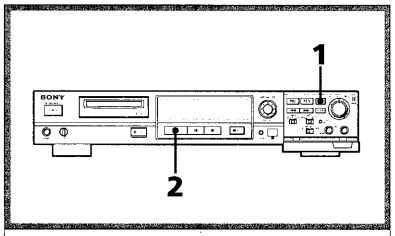
2 Press DATE RECORDED.
The track number flashes.



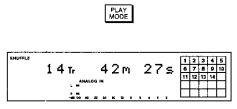
"No Date" appears if the built-in clock has not been set or the track was recorded on another unit without a date and time stamp function.
The previous display reappears when you press DATE RECORDED again or after a few seconds have passed.

Playing Tracks in Random Order (SHUFFLE Play)

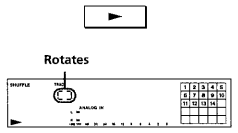
Use shuffle play to play back all tracks on an MD in random order. Do this procedure during playback for shuffle play starting with the current track.



1 Keep pressing PLAY MODE (SHUFFLE) while the recorder is stopped or playing until "SHUFFLE" lights up.



2 Press ►.
Shuffle play starts.



Specifying tracks during shuffle play

- To play the next track, turn the AMS dial clockwise (or press ▶▶|).
- To play from the beginning of the current track again, turn the AMS dial counterclockwise (or press |◀◀). You cannot use the AMS dial (|◀◀) to go to tracks that have already played.

To stop shuffle play

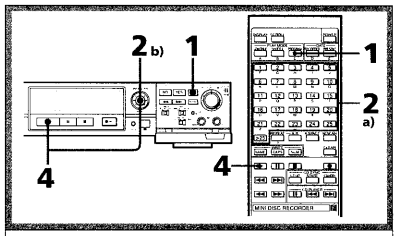
Press ■ .

To cancel shuffle play

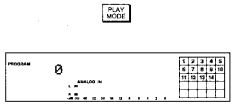
Keep pressing PLAY MODE (CONTINUE) until "SHUFFLE" goes off.

Playing Tracks in a Specific Order (PROGRAM Play)

Program play allows you to specify the playback order of up to 25 tracks. Do this procedure during playback for program play starting with the current track as the first track.

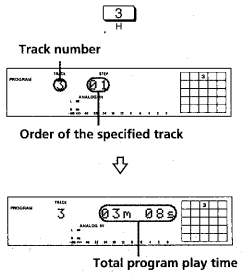


1 Keep pressing PLAY MODE (PROGRAM) while the recorder is stopped or playing until "PROGRAM" lights up.



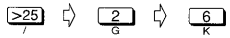
2 a) When using the remote commander:

Enter the track number with the numeric buttons.
The entered track number is programmed.
In this example, "3" is pressed.

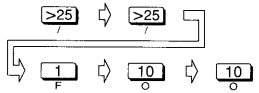


When programming tracks 26 to 99, press >25 once before pressing the respective numeric buttons.
When programming tracks 100 and above, press >25 twice before the respective numeric buttons.

Example: To program the 26th track

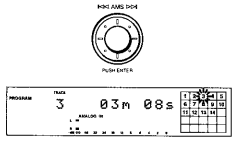


Example: To program the 100th track

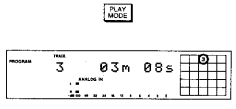


b) When using the front panel:
You can monitor the total program time as you enter each track number.

1 Turn the AMS dial until the track number to be entered lights up.

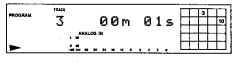


2 Press the AMS dial or PLAY MODE.
The selected track number is programmed.



3 Repeat step 2 to enter other tracks.
Each time you enter a track, the total program time is recalculated and displayed. You can program up to 25 tracks.

4 Press ► or the AMS dial.
Program play starts from the first track of the program.



Checking the order of programmed tracks

Turn the AMS dial (or press |◀◀ or ▶▶|) while the recorder is playing or paused. The track numbers appear in the order they were programmed.

To erase programmed tracks

Press CLEAR while the recorder is stopped to erase the program one track at a time starting from the end of the program.

To stop program play

Press ■ .

To cancel program play

Keep pressing PLAY MODE (CONTINUE) until "PROGRAM" disappears.

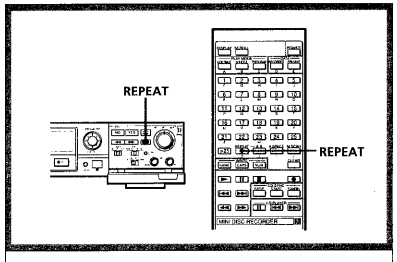
To make changes to a program

- To change a track just entered:
  Press CLEAR, then repeat the programming procedure from step 2 on page 18(E).
- To change all tracks:
  Press ■ while the recorder is stopped, then repeat the programming procedure from step 2 on page 18(E).

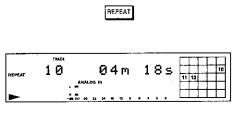
Playing Tracks Repeatedly

Playing tracks repeatedly

Use the repeat function for repeated playback in normal, shuffle or program play mode.



While the MD is playing, keep pressing REPEAT until "REPEAT" lights up.
All tracks play again.



To play back the current track repeatedly, press REPEAT twice.
"REPEAT 1" lights up.

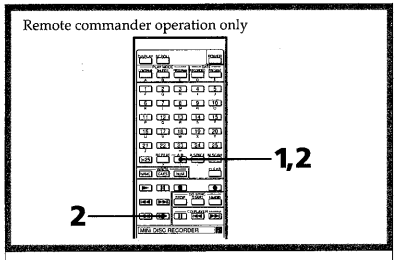
To play tracks repeatedly during shuffle or program play
Press REPEAT while in the respective playing mode.

To stop repeated playback
Press ■ .

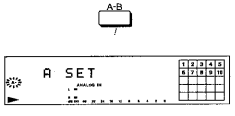
To cancel the repeat function
Keep pressing REPEAT until "REPEAT" disappears.
The recorder returns to the original playing mode.

Playing a specified portion repeatedly (A-B Repeat)

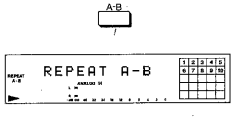
By specifying starting and ending points within a track, you can play back a specified portion repeatedly.



1 While the MD is playing, press A-B at the starting (point A) of the portion to be repeated.
Point A is stored.



2 Continue playing the track or press ►► until the end of the portion (point B), then press A-B.
Point B is stored, and the specified portion between A and B begins playing back repeatedly.

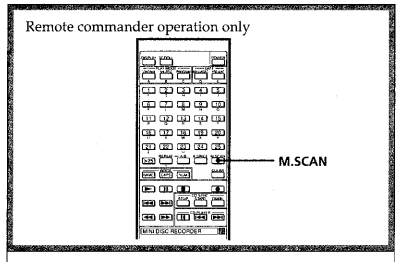


Changing the specified portion
Press A-B. Ending point B changes to starting point A.
Repeat step 2 to specify the new ending point (point B).

To cancel A-B repeat playback
Keep pressing REPEAT to turn off "REPEAT".

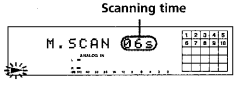
Scanning Tracks (Music Scan)

The music scan function automatically plays back the first 6, 10 or 20 seconds of each track in succession allowing you to quickly check the contents of the disc.



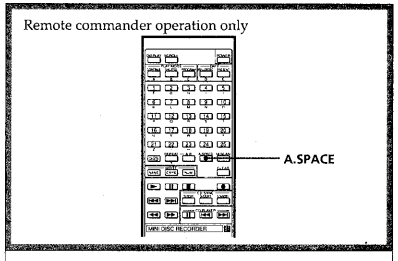
Press M.SCAN while the recorder is stopped.

The scanning time appears. Press M.SCAN to select a scanning time of 6, 10, or 20 seconds.

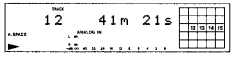


Inserting Spaces During Playback (Auto Space)

When the auto space function is on, the recorder inserts a three-second blank space after playing each track to allow use of the AMS function on tapes dubbed from the MD.



Press A.SPACE once.
"A.SPACE" lights up.



To cancel the auto space function
Press A.SPACE twice to turn off "A.SPACE".

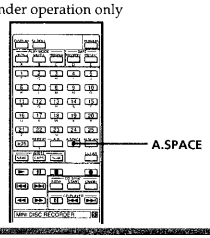
Note

Sound cut-off may occur at the start of new tracks
When a selection comprises consecutive tracks undivided by blank spaces (e.g., symphonies), the insertion of the three-second blank by the auto space function may result in some sound cut-off at the start of each track.

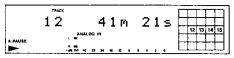
Pausing After Each Track (Auto Pause)

When the auto pause function is on, the recorder pauses after playing each track. To continue playing, press PAUSE. Auto pause is convenient when recording single tracks or multiple, non-consecutive tracks.

Remote commander operation only



Press A. SPACE twice.
"A. PAUSE" lights up.



To cancel the auto pause function
Press A.SPACE again to turn off "A.PAUSE".

Note

Pausing in the middle of selections
When a selection comprises consecutive tracks undivided by blank spaces (e.g., symphonies), the auto pause function may cause the recorder to pause at the start of each track within the selection.

Before Recording

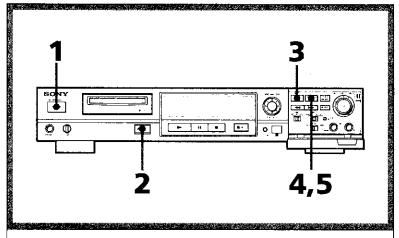
Selecting the recording mode

By selecting the recording mode, you can specify whether existing material on an MD is erased or not when you begin recording immediately after inserting an MD. The two available modes are described below:

All REC OFF — The recorder saves the contents of the MD and starts recording from the end of the existing material. This mode allows you to record from the end of existing material without searching for the ending position.

All REC ON — The recorder erases the contents of the MD and starts recording from the beginning of the MD. This mode allows you to quickly record over the entire contents of a previously recorded MD.

All REC OFF is the factory setting. To change the recording mode to All REC ON, follow the procedure below before inserting an MD into the recorder.

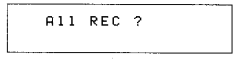


1 Press POWER to turn the recorder on.

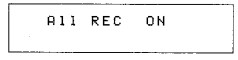
2 If a disc has been loaded, press ⏏ EJECT to eject the MD.

3 Press EDIT/NO.

4 Press YES.



5 Press YES.



The recording mode changes to All REC ON.

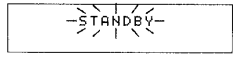
Restoring the recording mode to its factory setting
Repeat the above procedure, pressing EDIT/NO in step 5 to change the recording mode to All REC OFF.

If you start recording with All REC ON mode
The recorder erases the entire contents of the MD, then begins recording from the beginning of the MD. Note, however, that even a single recording or playback operation in All REC ON mode changes the mode to All REC OFF until that MD is ejected, and any new material thereafter is recorded from the end of the existing material on the MD. When the MD is ejected, the recording mode returns to All REC ON.

To erase the entire content of an MD in All REC OFF mode (factory setting)
Use the erase function on page 36(E) to erase the contents of the MD before the start of recording.

Notes

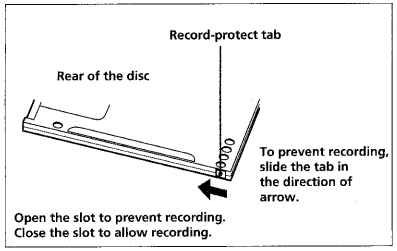
- When the power cord is unplugged for a long time, All REC ON mode changes to All REC OFF (factory setting), and "STANDBY" flashes when the recorder is plugged in and turned on again. If you want to change the recording mode to All REC ON, select the recording mode again before inserting an MD into the recorder.



- Always eject the MD, if loaded, before changing the recording mode.

Before Recording

To protect a MiniDisc against accidental erasure


Record-protect tab
Rear of the disc
To prevent recording, slide the tab in the direction of arrow.
Open the slot to prevent recording.
Close the slot to allow recording.

Caution

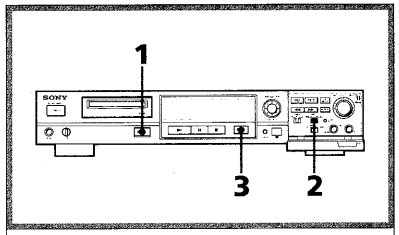
Changes to an MD made through recording or editing are finalized only when you update the TOC by ejecting the MD or changing the recorder to standby by pressing the power switch (TOC flashes at this time).
Prior to this, you should never pull out the power cord or turn off the switched outlet of an amplifier to which the MD recorder is connected since this will prevent the updating of the TOC and thus the changes will be lost.

Input monitor function

This procedure allows you monitor a selected signal source prior to recording by outputting the signal to the recorder's analog and digital output jacks.

When the INPUT selector switch is set to ANALOG
An analog input signal is output to the DIGITAL OUT jack after A/D conversion, and to the LINE OUT and PHONES jacks after further D/A conversion.

When the INPUT selector switch is set to DIGITAL 1 or 2
A digital input signal is output to the DIGITAL OUT jack after sampling rate conversion, and to the LINE OUT and PHONES jacks after further D/A conversion.



1 Press ⏏ EJECT to eject the disc.

2 Select the input signal to be monitored with the INPUT selector switch.

3 Press ● REC.
The selected input signal can now be monitored through the LINE OUT jacks, DIGITAL OUT jack, or PHONES jack.

To stop the input monitor function
Press ■ .

Recording

You can use your MD recorder to record in the following four ways:
- Recording from a digital source
- Recording from an analog source
- Recording from a microphone
- CD synchro recording

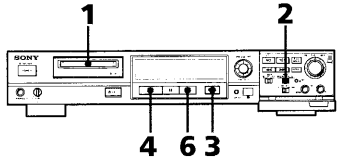
These recording methods are explained in the following four sections.

Notes on recording mode
- When recording from a digital or an analog source:
  — If the recording mode remains All REC OFF (factory setting), the recorder will record new material from the end of the existing material.*
  — If the recorder is set to All REC ON before inserting an MD, the recorder will erase the entire contents of the MD, then record the new material from the beginning of the disc.*
- During CD synchro recording:
  — The recorder stays in All REC OFF mode regardless of the recording mode setting and the recorder records new material from the end of the existing material.

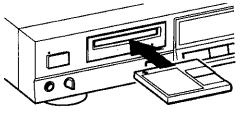
* To change the recording mode, see page 22(E).

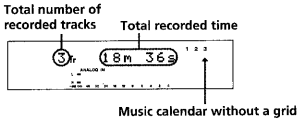
Recording a Digital Source

When you record from a digital source through the recorder's digital input jack, recording level adjustment is unnecessary. You can add track numbers either manually or automatically (see page 34(E)).



1 With the label side up and the arrow pointing toward the opening, slide the recordable MD into the disc compartment until the unit grips it.





2 Select DIGITAL 1 or DIGITAL 2 with the INPUT selector switch.

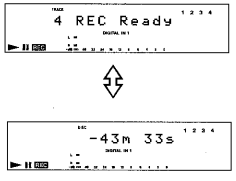
(Continued on next page)

Recording a Digital Source

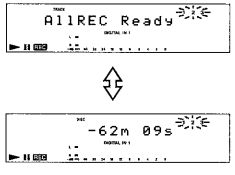
(Continued from previous page)

3 **Press ● REC (●).**
The recorder enters recording pause.

• If the recording mode is All REC OFF (factory setting), "REC Ready" will alternate with the remaining time on the disc in the display window.



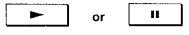
• If you changed the recording mode to All REC ON, "AllREC Ready" will alternate with the remaining time on the disc in the display window.



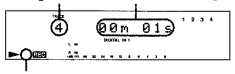
If the digital input jack is unconnected, "Din Unlock" will appear in the display window.

If recording pause continues for more than ten minutes, it is automatically canceled and the recorder stops.

4 **Press ► or II .**
Recording pause is canceled and recording starts.



Track number being recorded Elapsed recording time



" II " goes off.

5 **Play the sound source (CD player, etc.) to be recorded.**

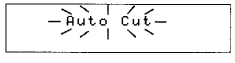
6 **Press ■ to stop recording.**
Recording stops.

To check the remaining time on the disc
Press DISPLAY.
Pressing DISPLAY while the recorder is stopped changes the display as follows: total recorded time, remaining time on the disc, disc name.
Pressing DISPLAY while the recorder is recording causes the remaining time on the disc to appear.

To pause recording
Press II .
Press ► or II again to restart recording.
Whenever recording is paused, the track number increases by one. For example, if you paused recording while recording the 4th track, recording continues on the 5th track when restarted.

To eject the disc
Press ⏏ EJECT.

If there is no sound for more than 20 seconds
The recorder stops recording, keeps a 2-second blank between tracks, and erases the remaining 18 seconds of silence. During the erasure, "Auto Cut" appears in the display window.



Using EDIT/NO to specify track marking
Press EDIT/NO during recording or recording pause to specify manual or automatic track marking. For details, see "Writing Track Numbers While Recording (Track Marking)" on page 34(E).

Notes

MD recording and the Serial Copy Management System
Since the MD recorder uses the SCMS (Serial Copy Management System), MDs recorded through the digital input jack cannot be used to make copies onto other MDs (see page 50(E)).

If "Protected" appears in the display window
The disc is record-protected. Close the slot to record on the disc (see "To protect a MiniDisc against accidental erasure" on page 24(E)).

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord.

When recording from digital sound sources
The recorder automatically records track numbers in the same sequence as the sound source (i.e., based on changes in the sampling frequency of the input signal).

When dubbing from another MD
The recorder automatically records track numbers in the same sequence as the source disc. However, if a track is recorded more than once (i.e., due to repeated playback during program play or single-track repeat play), the same track number is recorded each time.
Note also that the recorder cannot create tracks of less than 4 seconds in length.

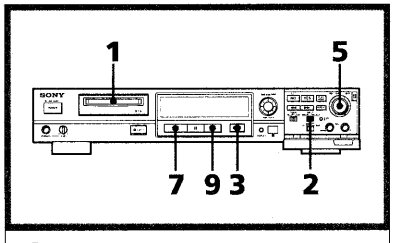
When recording an emphasized digital signal through the digital input jack
The recorder automatically de-emphasizes the signal before recording it. The result is digitally recorded sound that is very close to the original.

When you're digitally recording a disc from a SONY portable MD player (or perhaps other devices), press ■ (on this unit) before stopping the MD player.
If you stop playing the MD player or disconnect the optical cable from the DIGITAL IN of this unit before pressing ■ , the MiniDisc will not play when ► is pressed immediately after recording.
If you stop playing the MD player before you press ■ , please reinsert the recorded disc. Stopping play of the disc will not effect the recorded contents of the disc.

Recording From the Line (Analog) Input Jack

Analog recording

To write track numbers during analog recording, see "Writing Track Numbers While Recording (Track Marking)" on page 34(E).



1 With the label side up and the arrow pointing toward the opening, slide the recordable MD into the disc compartment until the unit grips it.

2 Select ANALOG with the INPUT selector switch.

3 Press ● REC (●).
The recorder enters recording pause.

- If the recording mode is All REC OFF (factory setting), "REC Ready" will alternate with the remaining time on the disc in the display window.

- If you changed the recording mode to All REC ON, "AllREC Ready" will alternate with the remaining time on the disc in the display window.

If recording pause continues for more than ten minutes, it is automatically canceled and the recorder stops.

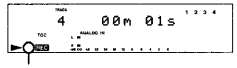
4 Play the sound source (CD player, cassette deck, etc.) to be recorded.

5 While monitoring the sound through the headphones, adjust the recording level with the REC LEVEL control (see page 29(E)).
Set the REC LEVEL control to the position show below when recording from a Sony DAT deck, CD player or cassette deck.

6 Stop the sound source to be recorded.

7 Press ► or II .
Recording pause is canceled and recording starts.

The track number and elapsed recording time (in minutes and seconds) of the track being recorded appear.



" II " goes off.

8 Restart the sound source to be recorded.

9 Press ■ to stop recording.
Recording stops.

To check the remaining time on the disc
Press DISPLAY (see page 26(E)).

To pause recording
Press II .
Press ► or II again to restart recording.
The track number increases by one each time you pause recording.

To eject a disc
Press ⏏ EJECT.

Using EDIT/NO to specify track marking
Press EDIT/NO during recording or recording pause to specify manual or automatic track marking. For details, see "Writing Track Numbers While Recording (Track Marking)" on page 34(E).

Notes

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord.

If "Protected" appears in the display window
The disc is record-protected. Close the slot to record on the disc (see page 24(E)).

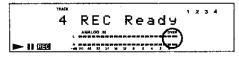
Adjusting the recording level

When recording sound sources through the line (analog) input jack or microphone, use the REC LEVEL control to adjust the recording level.

1 Press ● REC (●) to change the recorder to recording pause.

2 Play the sound source to be recorded.

3 While monitoring the sound through the headphones, adjust the recording level with the REC LEVEL control.
Adjust the recording level so that the peak level meter reaches its highest point with the least intrusion into the red (OVER) zone.
The outer knob controls the L (left) channel level and the inner knob the R (right) channel level. You can adjust the knobs together, or independently by turning one knob while holding the other.

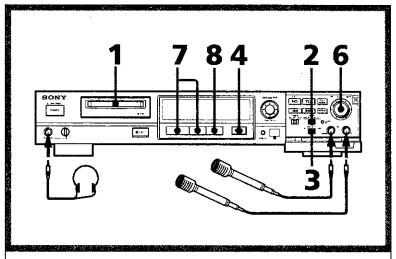


4 Press ► or II to start recording.

Recording From a Microphone

Except US, Canadian model only

To make a stereo recording, connect two microphones. When you record only to the left-channel jack, the same material is recorded to both channels.
To write track numbers while recording from a microphone, see "Writing Track Numbers While Recording (Track Marking)" on page 34(E). Note that only manual track marking is possible when recording from a microphone.



1 With the label side up and the arrow pointing toward the opening, slide the recordable MD into the disc compartment until the unit grips it.

2 Set the INPUT selector switch to ANALOG.

3 Set the MIC ATT switch to –20 dB, if necessary.
Excessively high signal input from the microphone is automatically lowered to a proper level.

4 Press ● REC (●).
The recorder enters recording pause.

- If the recording mode is All REC OFF (factory setting), "REC Ready" will alternate with the remaining time on the disc in the display window.

- If you changed the recording mode to All REC ON, "AllREC Ready" will alternate with the remaining time on the disc in the display window.

If recording pause continues for more than ten minutes, it is automatically canceled and the recorder stops.

5 Use the microphone to pick up the sound to be recorded.

6 While monitoring the sound through the headphones, adjust the recording level with the REC LEVEL control (see page 29(E)).

7 Press ► or II to cancel recording pause.
Recording starts.
The track number and elapsed recording time (in minutes and seconds) of the track being recorded appear.

" II " goes off.

8 Press ■ to stop recording.
Recording stops.

To check the remaining time on the disc
Press DISPLAY (see page 26(E)).

To pause recording
Press II .
Press ► or II again to restart recording.
The track number increases by one each time you pause recording.

Adding track numbers (track marking) while recording from the microphone
When recording from a microphone, only manual track marking is possible. Automatic track marking will not occur even when "LevelSync ON" is selected.

Notes

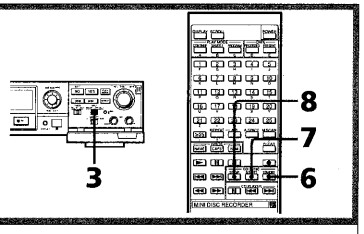
When you finish recording
Disconnect the microphone. The line input jacks on the rear of the unit will not work as long as the microphone is connected to the MIC jack.

If "Protected" appears in the display window
The disc is record-protected. Close the slot to record on the disc (see page 24(E)).

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord.

CD Synchro-Recording

By connecting your MiniDisc recorder to a Sony CD player or Hi-Fi Component System, you can easily dub CDs onto MDs using the CD synchro buttons on the remote commander. If your recorder is connected to a Sony CD player by the optional optical cable through the digital input jack, tracks are automatically recorded in the same sequence as the original onto the MD regardless of whether "LevelSync ON" or "LevelSyncOFF" is selected. During CD synchro-recording, the recording mode stays in All REC OFF mode regardless of the recording mode setting, and the recorder records new material from the end of the existing material.



1 Set the amplifier function selector to CD.

2 With the label side up and the arrow pointing toward the opening, slide the recordable MD into the disc compartment until the unit grips it.

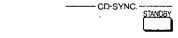
3 For digital recording, select DIGITAL 1 or DIGITAL 2 with the INPUT selector switch.

For analog recording, select ANALOG with the INPUT selector switch, then set the REC LEVEL control to the position shown below.

4 Insert a CD into the CD player.

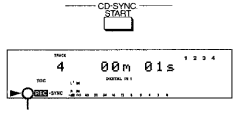
5 Select the playback mode (shuffle play, program play, etc.) on the CD player.

6 Press STANDBY.
The CD player enters play pause, and MD recorder enters recording pause.
"REC Ready" alternates with the remaining time on the disc in the display window.



If recording pause continues for more than ten minutes, it is automatically canceled and the recorder stops.

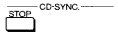
7 Press START.
The MD recorder starts recording and the CD player starts playback.
The track number and elapsed recording time of the track being recorded appear.



" ❚❚ " goes off.

If the CD player does not start playing
Some CD player models will not start playing when you press START. Press CD PLAYER/ ❚❚ instead.

8 Press STOP to stop recording.
Recording stops.



Successive CD synchro-recording of another CD
Follow the procedure below in place of step 8.
1 Press ■ on the remote commander of the CD player.
2 Change the CD.
3 Press ► on the remote commander of the CD player.
Synchro-recording restarts.

To pause recording
Press STANDBY or CD PLAYER/ ❚❚.
Press START or CD PLAYER/ ❚❚ to restart recording.
A new track number is created each time you pause recording.

To check the remaining time on the disc.
Press DISPLAY (see page 26(E)).

Notes

Place the CD player close to this recorder
As the same remote commander controls both the CD player and the recorder, you may have trouble operating both units if they are far from each other.

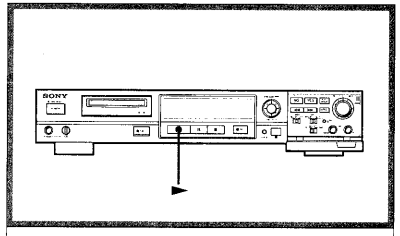
If "Protected" appears in the display window
The disc is record-protected. Close the slot to record on the disc (see page 24(E)).

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord.

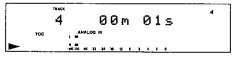
When recording from digital sound sources
The recorder records track numbers in the same sequence as the sound source (i.e., based on changes in the emphasis data).

Playing Back Tracks Just Recorded

Do this procedure to immediately playback tracks that have just been recorded.



Press ► immediately after finishing recording.
Playback starts from the first track just recorded.



Playing back from the first track of the disc after recording
1 Press ■ while the recorder is stopped.
2 Press ► or ❚❚.
Playback starts from the first track of the disc.

Writing Track Numbers While Recording (Track Marking)

Track marking is essentially the writing of track numbers while recording. By writing track numbers at specified points, you can quickly locate those points afterwards using the AMS function. You can specify the two following methods of recording track numbers:

Automatic track marking
The recorder writes a new track number whenever the signal level drops to a certain point. When recording from a CD through the digital input jack, track numbers are automatically written, regardless of the display status ("LevelSync ON" or "LevelSyncOFF").
Note that even when "LevelSync ON" is selected, you can write a new track number at any time by pressing ● REC (●).

Manual track marking
The recorder writes a new track number each time you pause recording.
The recorder also writes a new track number each time you press ● REC (●) while recording.

To add track numbers to existing recordings
Use the divide function to divide recorded tracks. A new track number is written each time you divide a track. For details, see "Dividing Recorded Tracks (Divide Function)" on page 38(E).

Automatic track marking (LevelSync ON)

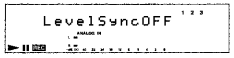
1 Press EDIT/NO while the recorder is recording or in recording pause to display "LevelSync ?".
- During recording: Pressing EDIT/NO once lights up "Name in ?". Pressing twice lights up "LevelSync ?".
- During recording pause: Pressing EDIT/NO once lights up "LevelSync ?".

2 Press YES twice to display "LevelSync ON".

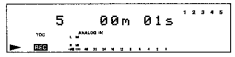
Manual track marking (LevelSyncOFF)

1 Press EDIT/NO while the recorder is recording or in recording pause to display "LevelSync ?".

2 Press YES, then EDIT/NO to display "LevelSyncOFF".



3 While recording, press ● REC (●) at the point you want to add a track mark.
The track number increases by one, and recording on the new track begins (the elapsed recording time restarts from zero).



Note
During automatic track marking, the signal level must remain low for 2 or more seconds before a new track number is written.

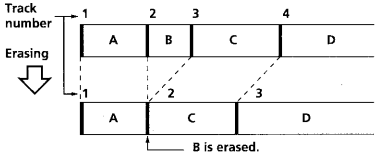
Editing Functions for a Recorded MiniDisc

The editing functions allow you to erase, divide, combine and move tracks that have been recorded on an MD.
A brief introduction to each function appears on this page.

Erasing recordings (erase function) (see page 36(E))

The erase function allows you to erase a single track, an entire disc, or parts of a track easily and instantly. Since erasing merely updates the table of contents (TOC), there is no need to record over existing material as in the case of cassette tapes.

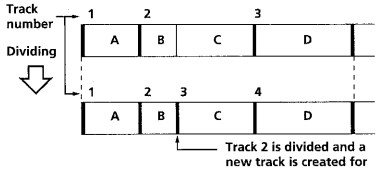
Example: Erasing B



Dividing recorded tracks (divide function) (see page 38(E))

The MD unit records sound sources through the LINE IN (analog) jacks or microphone as a single track on the disc. To randomly access individual tracks or portions within this track, use the divide function to create separate tracks for each song or portion. When you divide a track, the total number of tracks increments by one, and all tracks following the divided track are renumbered.

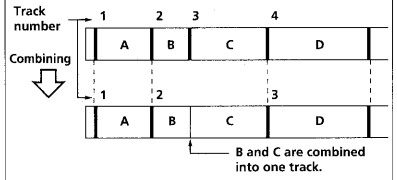
Example: Dividing track 2 to create a new track for C



Combining recorded tracks (combine function) (see page 40(E))

Use combine function to combine consecutive tracks on a recorded MD. It is useful for combining several songs into a single medley, or several independently recorded portions into a single track. When two tracks are combined, the total number of tracks decreases by one, and all tracks following the combined track are renumbered.

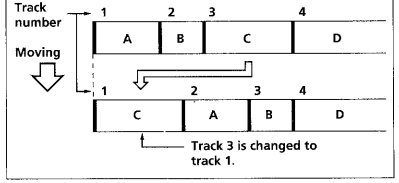
Example: Combining B and C



Moving recorded tracks (move function) (see page 41(E))

With the move function, you can change the order of any track.
After a track is moved, the track numbers following the new position are increased by one.

Example: Moving tracks



Labeling recordings (title function) (see page 43(E))

Use the title function to create titles for your recorded discs and tracks. Titles — which may consist of uppercase and lowercase letters, numbers, symbols and spaces — appear in the display window during recorder operation.

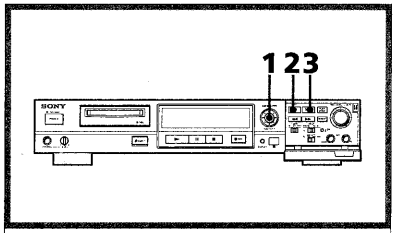
Erasing Recordings (Erase Function)

You can use the erase function to do the following:
- Erase a single track
- Erase a disc
- Erase a part of a track

After you erase a specific track, the total number of tracks decreases by one, and all tracks following the erased track are renumbered.
Since tracks following an erasure are renumbered, you should erase multiple tracks in order of larger to smaller track numbers to prevent the renumbering of tracks not yet erased.
Note that once erased, a track cannot be recovered.

Erasing a single track

You can erase a track while the recorder is stopped, playing or paused simply by specifying the respective track number.

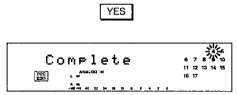


1 **Turn the AMS dial until the number of the track to be erased lights up.**

Example: Erasing track 4

2 **Keep pressing EDIT/NO until "Erase?" lights up.**

3 **Press YES.**
When the specified track has been erased, "Complete" lights up for a few seconds and the music calendar decreases by one.



If you erase a track during playback, the following track begins playing afterwards.

4 **Repeat steps 1 to 3 to erase additional tracks.**

To cancel the erase function
Press EDIT/NO, ■ or turn the AMS dial to change the track number, causing "Erase?" to disappear.

Notes

If the following indication goes on

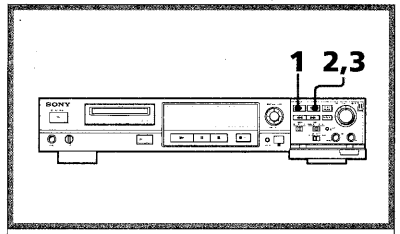
The track was recorded or edited on another unit and is record-protected. If this indication appears, press YES to erase the track.

If the "Protected" indication lights up
The recorder could not erase the specified track because the record-protect slot on the disc is open. Erase the track after closing the slot.

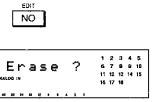
When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

Erasing an MD

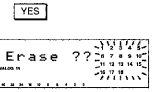
Erasing a recordable MD deletes all recorded tracks. **Note that once erased, a disc cannot be recovered.**



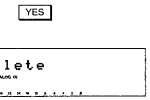
1 **While the recorder is stopped, keep pressing EDIT/NO until "All Erase ?" lights up.**



2 **Press YES.**



3 **Press YES again.**
When all recorded tracks have been erased, "Complete" lights up for a few seconds and the music calendar disappears.

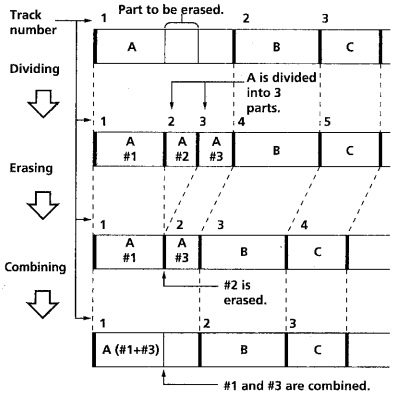


To cancel the erase function
Press EDIT/NO or ■.

Erasing a part of a track

By using the dividing, erasing and combining functions, you can erase specific portions of a track.

Example: Erasing a part of selection A



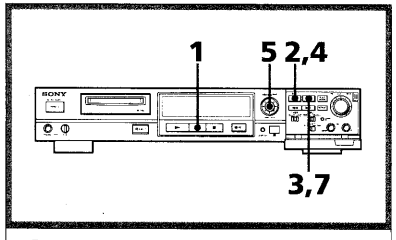
Notes

If the "Protected" indication lights up
The recorder could not edit the specified track because the record-protect slot on the disc is open. Edit the track after closing the slot.

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

Dividing Recorded Tracks (Divide Function)

Use the divide function to create a new track number for a specific portion of an existing track during playback. By creating track numbers for specific portions, you can use the AMS function to randomly access those portions afterwards.
When you divide a track, the total number of tracks increases by one, and all tracks following the divided track are renumbered.
To create track numbers during recording, see "Writing Track Numbers While Recording (Track Marking)" on page 34(E).



1 **While playing the MD, press II to pause playback at the point where you want to create a new track.**

II

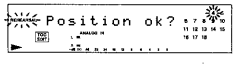
2 **Keep pressing EDIT/NO until "Divide ?" lights up.**

EDIT
NO

Example: Dividing track 4

3 **Press YES to divide the track.**
"REHEARSAL" flashes and the starting portion of the new track plays back repeatedly.

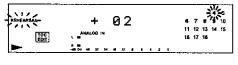
YES



4 **If the starting portion is incorrect, press EDIT/NO. (If it is okay, go to step 7.)**

EDIT
NO

5 **While monitoring the sound, turn the AMS dial to find the starting point of the new track.**
The starting portion of the new track is played back repeatedly.
The starting position can be moved within a range of –128 to +127 steps of about 0.06 second each.



6 **If the starting portion is still incorrect, repeat step 5 until you attain the correct portion.**

7 **Press YES or the AMS dial when the correct position is attained.**
When the track has been divided, "Complete" lights up for a few seconds and the newly created track begins playing. The new track will have no track title even if the original track was labeled.

YES

To cancel the divide function
Press EDIT/NO or ■ .

To undo a track division
Combine the tracks again (see "Combining Recorded Tracks" on page 40(E)) then redivide the tracks if necessary.

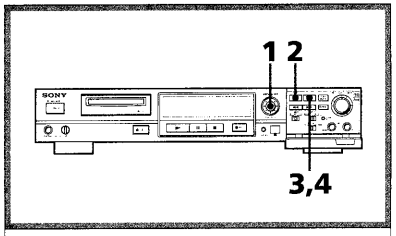
Notes

If the "Protected" indication lights up
The recorder could not divide the specified track because the record-protect slot on the disc is open. Divide the track after closing the slot.

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

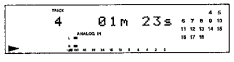
Combining Recorded Tracks (Combine Function)

The combine function allows you to combine consecutive tracks on a recorded disc while the recorder is stopped, playing or paused.



1 **Turn the AMS dial until the second track of the two to be combined appears.**

Example: Combining tracks 3 and 4



2 **Keep pressing EDIT/NO until "Combine ?" lights up.**

3 **Press YES.**
"REHEARSAL" flashes and the portion where the two tracks will join (i.e., the end of the first track and the beginning of the second track) repeatedly plays back.

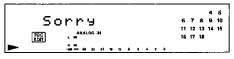
4 **Verify the tracks, then press YES.**
When the tracks have been combined, "Complete" lights up for a few seconds and the music calendar decreases by one.
If both of the combined tracks have track titles, the title of the second track is erased (as well as other information such as the recording date).

To cancel the combine function
Press EDIT/NO or ■ .

To undo a track combination
Divide the tracks again (see "Dividing Recorded Tracks" on page 38(E)), then repeat the combine function with the correct tracks if necessary.

Notes

If the following indication lights up



The recorder could not combine the specified tracks. Extensive editing of the same track may render it impossible to combine with another track. This is due to the technical limitation of the MD system and is not a mechanical error.

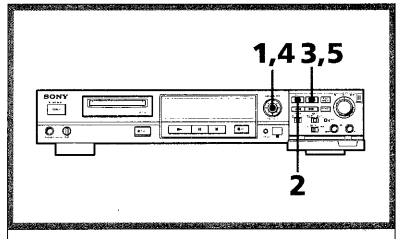
If the "Protected" indication lights up
The recorder could not combine the specified tracks because the record-protect slot on the disc is open. Combine the track after closing the slot.

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

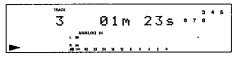
Moving Recorded Tracks (Move Function)

Use this function to change the order of specific tracks while the recorder is stopped, playing or paused.
After moving a track, track numbers following the new track position increase by one.

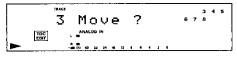
Example: Moving track 3 to track position 5



1 **Turn the AMS dial until the number of the track to be moved appears.**
The number of the track to be moved lights up.



2 **Keep pressing EDIT/NO until "Move ?" lights up.**

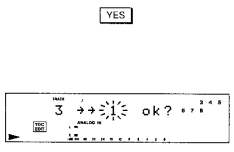


(Continued on next page)

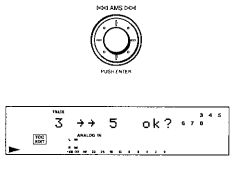
Moving Recorded Tracks (Move Function)

(Continued from previous page)

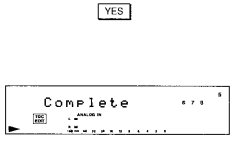
3 **Press YES.**
The number of the track to be moved and the new track position light up.



4 **Turn the AMS dial to specify the new track position.**



5 **Press YES or the AMS dial.**
When the track has been moved, "Complete" lights up for a few seconds and the moved track begins playing back if the unit is in playback mode.



To cancel the move function
Press ■ .

Notes

If the "Protected" indication lights up
The recorder could not move the specified track because the record-protect slot on the disc is open. Move the track after closing the slot.

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

Labeling Recordings (Title Function)

Using the front panel controls or the remote commander, you can create titles for your recorded MDs and tracks. Titles — which may consist of up to 100 uppercase and lowercase letters, numbers and symbols for a maximum of about 1,700 characters per disc — appear in the display window during MD operation. To turn off the title display, follow the procedure below.

Turning off the title display

1 Press ⏏ EJECT to eject the MD.

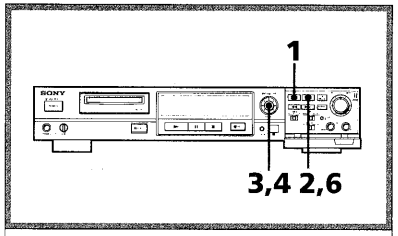
2 Press EDIT/NO to cause "Select Name ?" to light up.

3 Press YES to cause "Name ON ?" to light up.

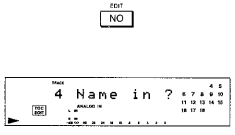
4 Press EDIT/NO to cause "Name OFF" to light up.
To turn on the title display again, repeat the above procedure, pressing YES in step 4 to cause "Name ON" to light up.

Labeling a track with the front panel controls

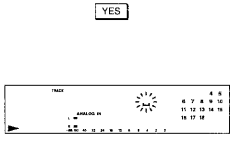
Use the following procedure to label a track with the front panel controls. **You can label a track only while it is playing. If the track ends before you've completed the label, the characters entered to that point are not recorded and the track will remain unlabeled.**



1 **Keep pressing EDIT/NO while playing, pausing or recording the track to be labeled until "Name in ?" lights up.**



2 **Press YES.**
A flashing cursor appears.

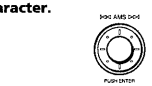


(Continued on next page)

Labeling Recordings (Title Function)

(Continued from previous page)

3 Turn the AMS dial to select the first character.



Letters, numbers, and symbols appear in sequential order as you turn the AMS dial.
The following symbols can be used in titles: ! " # $ % & ' ( ) * + , – . / : ; < = > ? @ [¥] ^ _ ` { | } ~
Note, however, that the symbols [¥] { | } ~ may not be supported on certain MD recorder models.

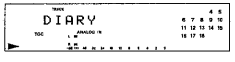
4 Press the AMS dial to enter the selected character.
The cursor shifts rightward and waits for input of the next character.

5 Repeat steps 3 and 4 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ to move the flashing cursor under the character to be corrected, and repeat steps 3 and 4 to enter the correct character.
To erase a character
Press ◀◀ or ▶▶ to move the flashing cursor under the character to be erased, then press EDIT/NO.
To enter a space
Press the AMS dial or ▶▶ .

6 Press YES.
When the labeling procedure has been completed, the title appears on the left side of the display window.

YES



Labeling an MD with the front panel controls

After inserting the MD to be labeled, use the procedure below to label the MD with the front panel controls.

1 Keep pressing EDIT/NO while the recorder is stopped until "Name in ?" lights up.

2 Repeat steps 2 to 6 of "Labeling a track with the front panel controls" on pages 43(E) and 44(E).

To cancel the title function
Press ■ .

Erasing all track titles on a disc
1 Hold down EDIT/NO while the recorder is stopped until "All Erase ?" lights up.
2 Press EDIT/NO again until "Name Erase?" lights up.
3 Press YES.

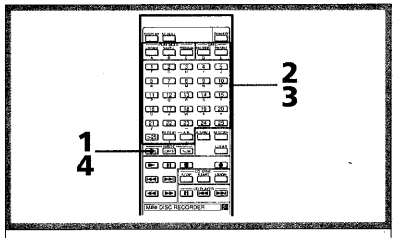
Notes

If the "Protected" indication lights up
The recorder could not label the specified track because the record-protect slot on the disc is open. Label the track after closing the slot.

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

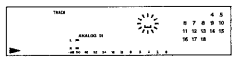
Labeling a track with the remote commander

Use the following procedure to label a track with the remote commander.

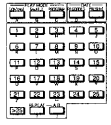


1 Keep pressing NAME while playing back, pausing or recording the track to be labeled.
A flashing cursor appears.

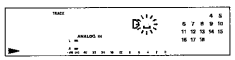
NAME



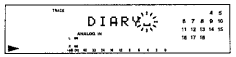
2 Enter one character at a time.



Entering the letter "D"



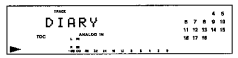
3 Repeat step 2 until you have entered the entire title.



If you entered the wrong character
Press ◀◀ or ▶▶ to move the flashing cursor under the character to be corrected.
Press CLEAR to erase the incorrect character, then enter the correct letter.

4 Press NAME again.
When the labeling procedure has been completed, the entered title appears on the left side of the display window.

NAME



Labeling an MD with the remote commander

After inserting the MD to be labeled, follow the procedure below to label a disc with the remote commander.

1 Press NAME while the recorder is stopped.

2 Repeat steps 2 to 4 of "Labeling a track with the remote commander" on this page.

Labeling Recordings (Title Function)

Entering lowercase letters
1 Keep pressing CAPS until "Selected abc" lights up.
2 Enter the characters.

Entering uppercase letters again
1 Keep pressing CAPS until "Selected ABC" lights up.
2 Enter the characters.

Entering numbers
1 Keep pressing NUM until "Selected 123" lights up.
2 Enter the numbers.

Entering uppercase or lowercase letters again
1 Keep pressing CAPS or NUM until "Selected ABC" or "Selected abc" lights up.
2 Enter the characters.

To cancel the title function
Press ■ .

Changing an existing title
1 To change a track title, press NAME while playing back the respective track to cause the track name to light up.
To change a disc title, press NAME while the recorder is stopped to cause the title of the loaded MD to light up.
2 Hold down CLEAR until the current title is erased, then enter the new title.
3 Press NAME.

Erasing all recorded titles simultaneously (name erase function)
Use this function to erase all titles on an MD simultaneously. Note that once erased, titles cannot be recovered.
1 Keep pressing EDIT/NO while the recorder is stopped until "Name Erase?" lights up.
To cancel the name erase function
Press ■ .
2 Press YES.
"Complete" lights up after all titles have been erased.

Notes

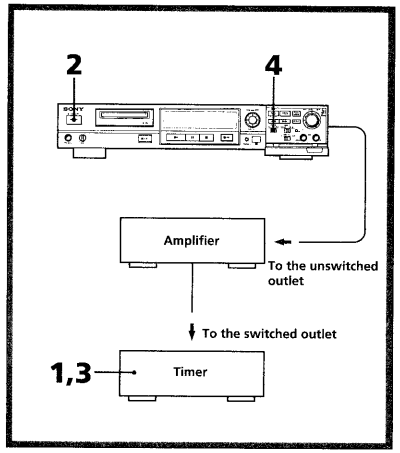
If the "Protected" indication lights up
The recorder could not label the disc because the record-protect slot on the disc is open. Label the disc after closing the slot.

When "TOC" flashes in the display window
Do not jog the recorder or pull out the power cord. After the recorder updates the contents of the recording, "TOC" lights up. If you've made any changes to the MD, "TOC" lights up. If you press ⏏ EJECT or POWER at this time, "TOC" flashes as the actual contents of the MD are updated.

Additional Information

Timer-Activated Recording and Playback

By connecting an optional timer, you can record or play back automatically at a preset time. This function is useful when you want to wake to MD sound in the morning. For details, refer to the operating instructions of the timer and amplifier.



Timer-activated recording
1 Turn on the timer.
2 Press POWER to turn on the recorder and prepare the recorder for recording by following steps 1 to 3 on pages 25(E) and 26(E) for digital recording, and steps 1 to 6 on page 28(E) for analog recording.
3 Set the starting time on the timer. Power to all equipment connected to the timer turns off.
4 Set TIMER to REC. At the designated time, power to all equipment turns on and recording starts.

When timer-activated recording is completed
- Set TIMER to OFF. If TIMER is left at REC, the recorder will automatically start recording the next time you turn the recorder on. Recording and editing operations are not possible while TIMER is set to REC.
- After setting TIMER to OFF, turn on the power. The TOC on the MD is updated and the recorded contents are written to the MD. If you wish to unplug the MD recorder after timer-activated recording, make sure to turn on the power to update the TOC beforehand; if you don't, the recorded contents will be lost in about an week.

Notes on timer-activated recording
- Timer-activated recording will not occur and an error message will appear on the display when the inserted disc is a premastered disc, a record-protected disc, or a full disc.
- Material recorded during timer-activated recording will be saved to the disc as one track the next time you turn the recorder on. "TOC" will flash in the display window at that time. Do not jog the recorder or pull out the power cord while "TOC" is flashing.
- The recorder will record new material from the end of the existing material regardless of the recording mode setting ("All REC OFF" or "All REC ON").
- The recorder will stop recording and enter standby if the recording capacity on the disc becomes full, or an abnormality is encountered in the digital input signal.

Timer-activated playback
1 Turn on the timer.
2 Press POWER to turn on the recorder and insert the disc. Press PLAY MODE to select the playback mode (i.e., CONTINUE, SHUFFLE, or REPEAT). Program play cannot be activated by timer. If you select program play, normal playback will occur instead.
3 Set the starting time on the timer. Power to all equipment connected to the timer turns off.
4 Set TIMER to PLAY. At the designated time, power to all equipment turns on and playback starts.

When timer-activated playback is completed
Set TIMER to OFF. If TIMER is left at PLAY the recorder will automatically start playing the next time you turn the recorder on.

Display Messages

The following table explains the various messages that appear in the display window.

Message	Meaning
Blank Disc	A new (blank) or erased disc has been inserted.
Cannot Copy	An attempt was made to make a second copy from a digitally dubbed MD (see page 50(E)).
Cannot EDIT	An attempt was made to edit the disc during PROGRAM or SHUFFLE play or the inserted disc contains Japanese ideograms.
Disc Error	The disc is abnormal (scratched or missing a TOC).
Disc Full	The disc is full (see "System Limitations").
Impossible	An attempt was made to combine tracks while playing back the first track.
Name Full	The titling capacity of the disc has reached its limit (about 1,792 characters).
NO DISC	There is no disc in the unit.
No Track	The inserted disc has a disc title but no tracks.
Protected	The inserted disc is record-protected.
Retry	The first recording attempt failed due to a disturbance or scratch on the MD, and a second recording is being made.
Retry Error	Due to vibrations to the recorder or scratches on the disc, several recording attempts were made but with no success.
Sorry	An attempt was made to combine tracks that cannot be combined.
TimerRec Err	Timer-activated recording has not been performed.

System Limitations

The recording system in your MiniDisc recorder is radically different from those used in cassette and DAT decks and is characterized by the limitations described below. Note, however, that these limitations are due to the inherent nature of the MD recording system itself and not to mechanical causes.

"Disc Full" lights up even before the disc has reached the maximum recording time (60 or 74 minutes)
When 255 tracks have been recorded on the disc, "Disc Full" lights up regardless of the total recorded time. More than 255 tracks cannot be recorded on the disc. To continue recording, erase unnecessary tracks or use another recordable disc.

"Disc Full" lights up before the maximum number of tracks is reached
Fluctuations in emphasis within tracks are sometimes interpreted as track intervals, incrementing the track count and causing the "Disc Full" indication to light up.

The remaining recording time does not increase even after erasing numerous short tracks
Tracks of under 8 seconds in length are not counted and so erasing them may not lead to an increase in the recording time.

Some tracks cannot be combined with others
Track combination may become impossible when tracks are edited.

The total recorded time and the remaining time on the disc may not total the maximum recording time (60 or 74 minutes)
Recording is done in minimum units of 2 seconds each, no matter how short the material. The contents recorded may thus be shorter than the maximum recording capacity. Disc space may also be further reduced by scratches.

Tracks created through editing may exhibit sound dropout during search operations.

Track numbers are not recorded correctly
Incorrect assignment or recording of track numbers may result when (1) CD tracks are divided into several smaller tracks during digital recording, or (2) certain CDs are recorded with both the "LevelSync ON" indication and automatic track marking function on.

"TOC Reading" indication appears for a long time
If the inserted recordable disc is brand new, the "TOC Reading" indication appears on the display longer than for those that have been used.

Your MiniDisc recorder can be used to play back monaural format MDs.

What is the MiniDisc?

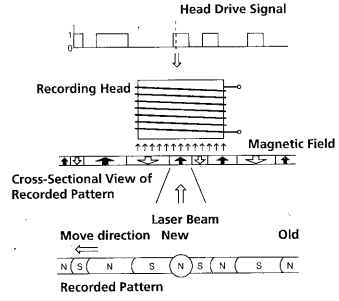
How MiniDiscs work

MiniDiscs (MD) come in two types: premastered (prerecorded) and recordable (blank). Premastered MDs, recorded at music studios, can be played back almost endlessly. However, they can't be recorded on or over like cassette tapes. To record, you use a "recordable MD".

Premastered MDs
Premastered MDs are recorded and played like regular CDs. A laser beam focuses on the pits in the surface of the MD and reflects the data back to the lens in the recorder. The recorder then decodes the signals and plays them back as music.

Recordable MDs
Recordable MDs, which use magneto-optical (MO) technology, can be recorded again and again. The laser inside the recorder applies heat to the MD, demagnetizing the magnetic layer of the MD. (See illustration below.) The recorder then applies a magnetic field to the layer. This magnetic field corresponds exactly to the audio signals generated by the connected source. (The north and south polarities equate to digital "1" and "0".) The demagnetized MD adopts the polarity of the magnetic field, resulting in a recorded MD.

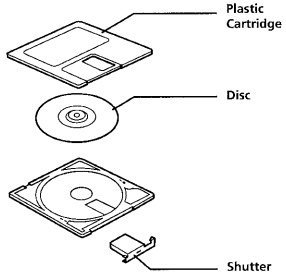
■ Recording Mechanism



How the MiniDisc got so small

The 2.5-inch MiniDisc, encased in a plastic cartridge that looks like a 3.5-inch diskette (see illustration below), uses a new digital audio compression technology called ATRAC (Adaptive TRansform Acoustic Coding). To store more sound in less space, ATRAC extracts and encodes only those frequency components actually audible to the human ear.

■ Parts Making Up a MiniDisc



How quick random access and the TOC (Table Of Contents) systems work

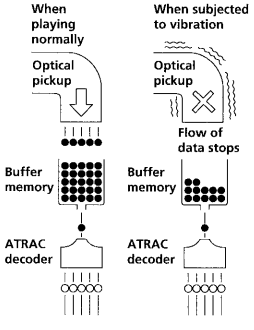
Like CDs, MDs offer instantaneous random access to the beginning of any music track. Premastered MDs are recorded with location addresses corresponding to each music selection. Recordable MDs are manufactured with a "User TOC Area" to contain the order of the music. The TOC system is similar to the "directory management system" of floppy disks. In other words, starting and ending addresses for all music tracks recorded on the disc are stored in this area. This lets you randomly access the beginning of any track as soon as you enter the track number (AMS), as well as label the location with a track name as you would a file on a diskette.

What is the MiniDisc?

How the Shock-Resistant Memory works

One major drawback of optical read systems is that they can skip or mute when subjected to vibration. The MD system resolves this problem by using a buffer memory that stores up to 10 seconds of audio data. This is possible because of a 1 second lag between the time audio data is picked up and when it is decoded (see illustration below). Should the optical pickup be jarred out of position, the correct audio data plays from the buffer memory. Using a concept called "sector repositioning," the optical pickup has the ability to within 13 milliseconds identify the disruption and resume reading from the correct point. As long as the optical pickup returns to the correct position within about 10 seconds, you never experience mistracking or muting.

■ Shock-Resistant Memory System



Preparations

Precautions

On safety
- The unit is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the unit itself has been turned off.
- AC power cord must be changed only at the qualified service shop.
- Should any solid object or liquid fall into the unit, unplug the unit and have it checked by qualified personnel before operating it any further.

On power sources
- Unplug the unit from the wall outlet when it is not to be used for an extended period of time.

On operation
- If the unit is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lenses inside the MiniDisc recorder, causing the MiniDisc recorder to operate improperly. Should this occur, remove the disc and wait about an hour for the moisture to evaporate.

On the MiniDisc cartridge
- Do not open the shutter to expose the disc.
- Do not place the cartridge where it will be subject to extremes of sunlight, temperature, moisture or dust.

On cleaning
- Clean the casing with a soft cloth slightly moistened with water or a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzene as it may mar the finish of the casing.

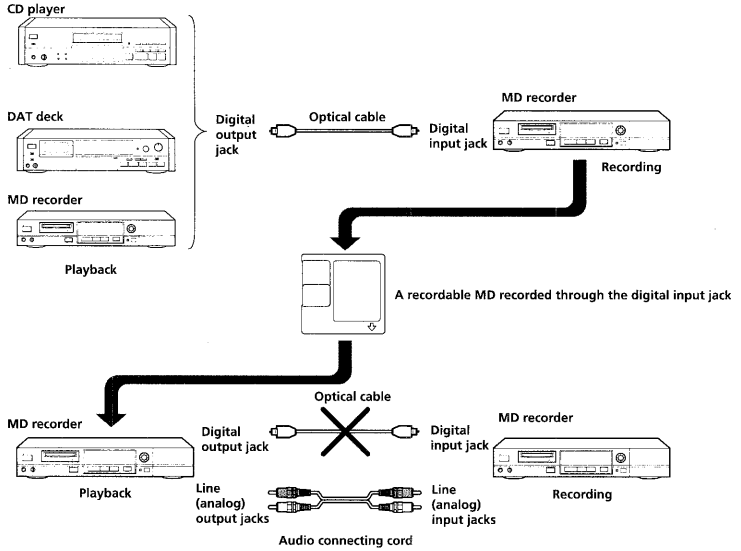
If you have any questions or problems concerning your unit, please consult your nearest Sony dealer.

Guide to the Serial Copy Management System

Since your MD unit uses the Serial Copy Management System (SCMS), MDs recorded through the digital input jack cannot be used to make copies to other MDs through the digital output jack. The diagrams on this and the following pages show systems for making copies through the digital or analog jacks.

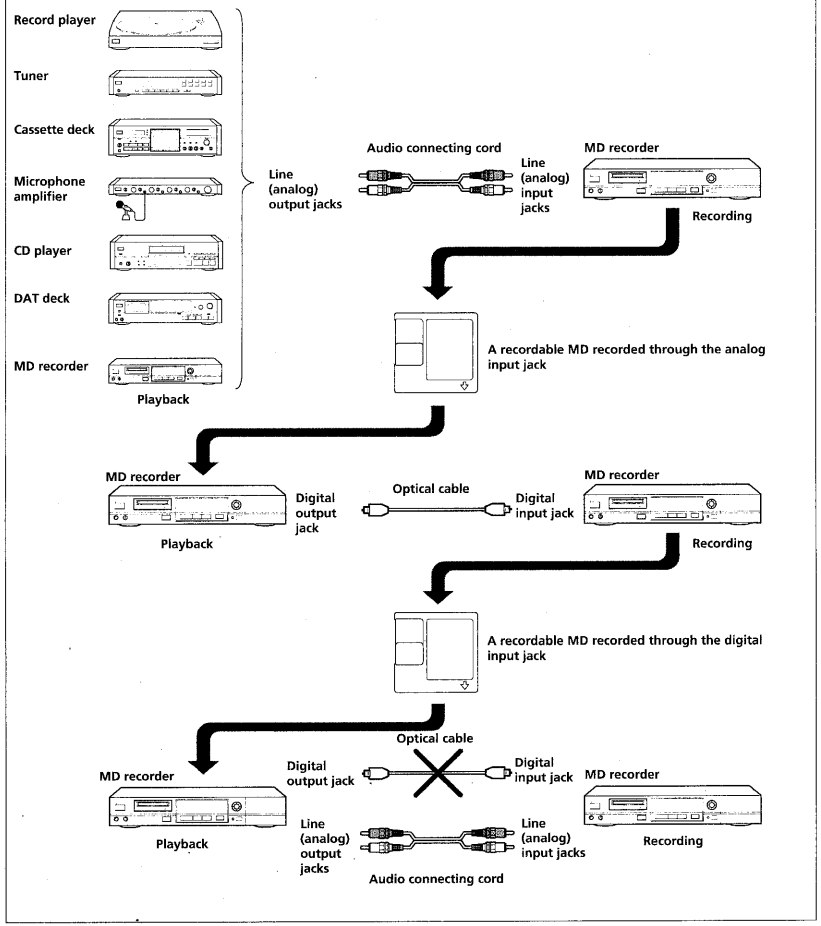
1 You can record digital sources (CD, prerecorded MD, and DAT equipment) to a recordable MD through the digital input jack.

However, you cannot make copies of the recorded MD to other recordable MDs through the digital output jack. Subsequent copies can only be made through analog output jacks.



2 A recordable MD with material from analog sources (analog records or FM programs, etc.) recorded through the line input jack can be copied to another recordable MD through the digital output jack.

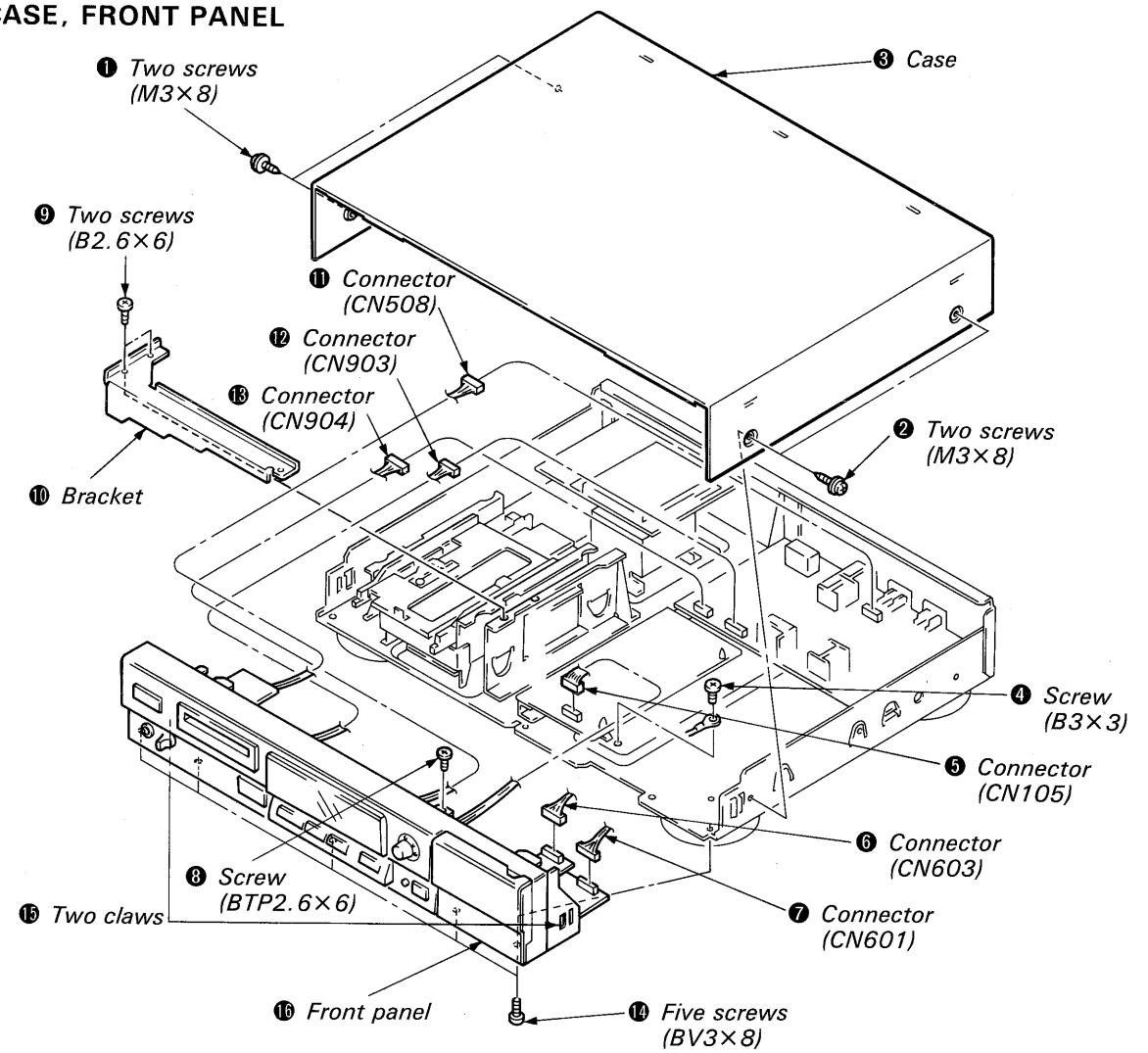
However, you cannot make copies of the recorded MD to other recordable MDs through the digital output jack. Subsequent copies can only be made through analog output jacks.



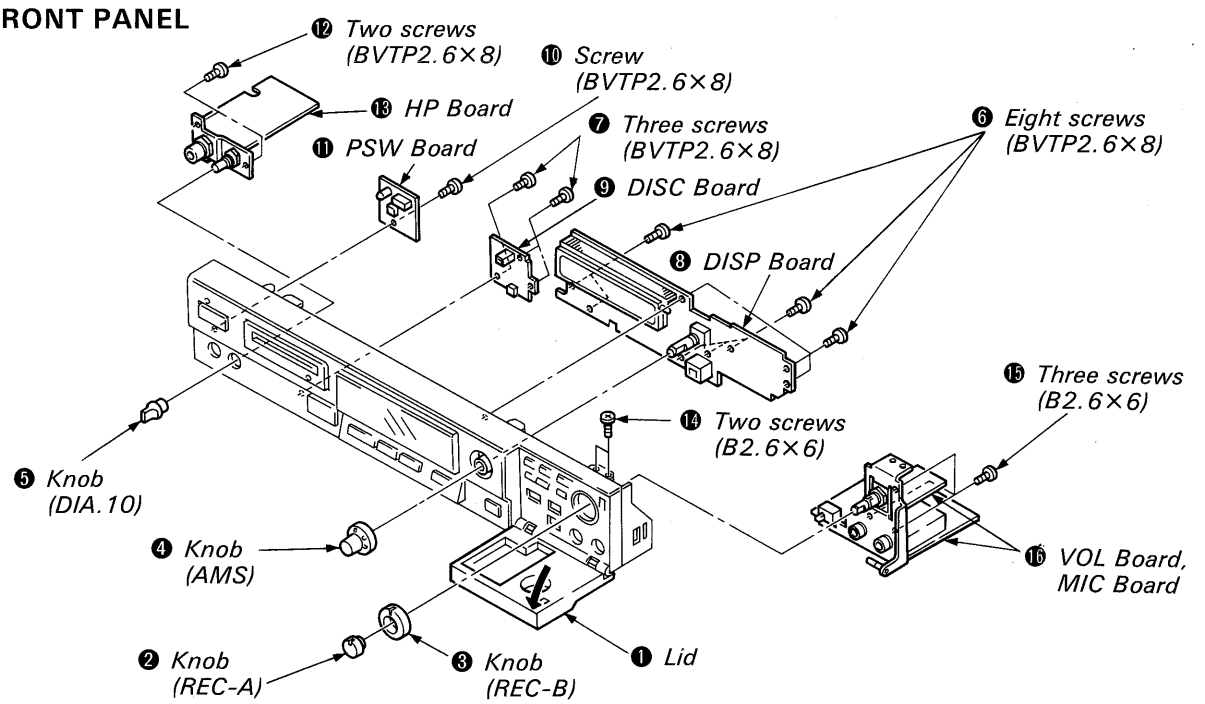
SECTION 2
DISASSEMBLY

NOTE: Follow the disassembly procedure in the numerical order given.

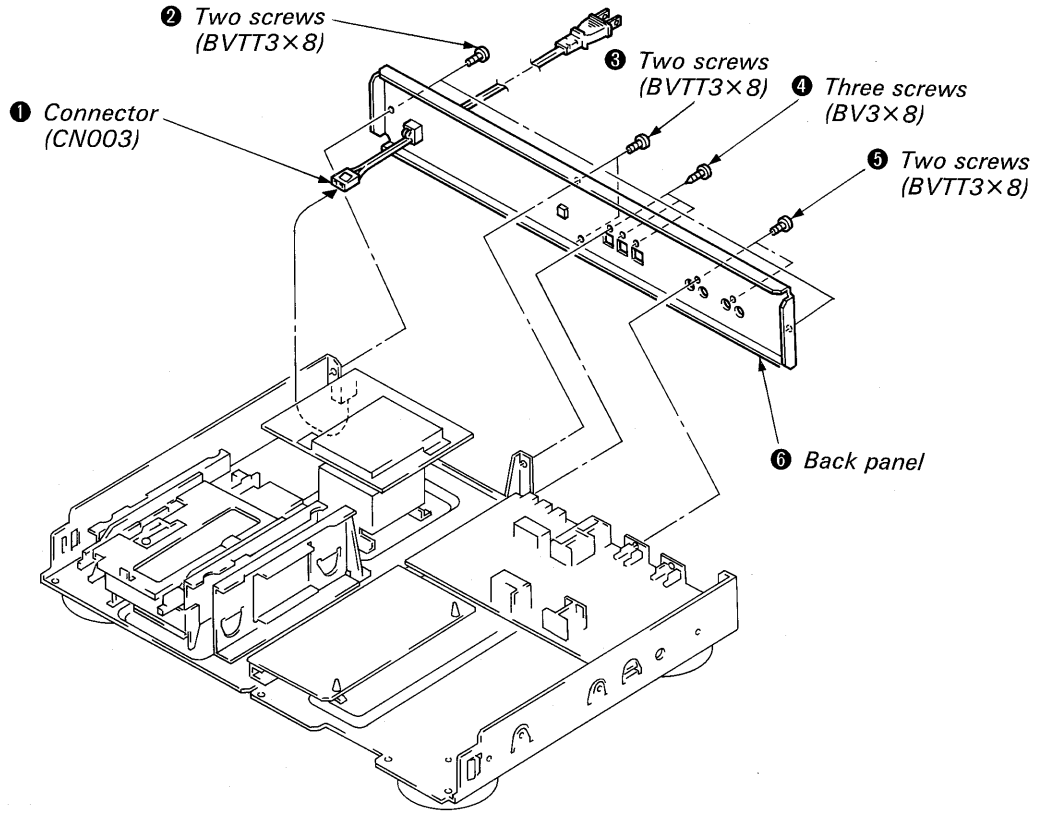
2-1. CASE, FRONT PANEL



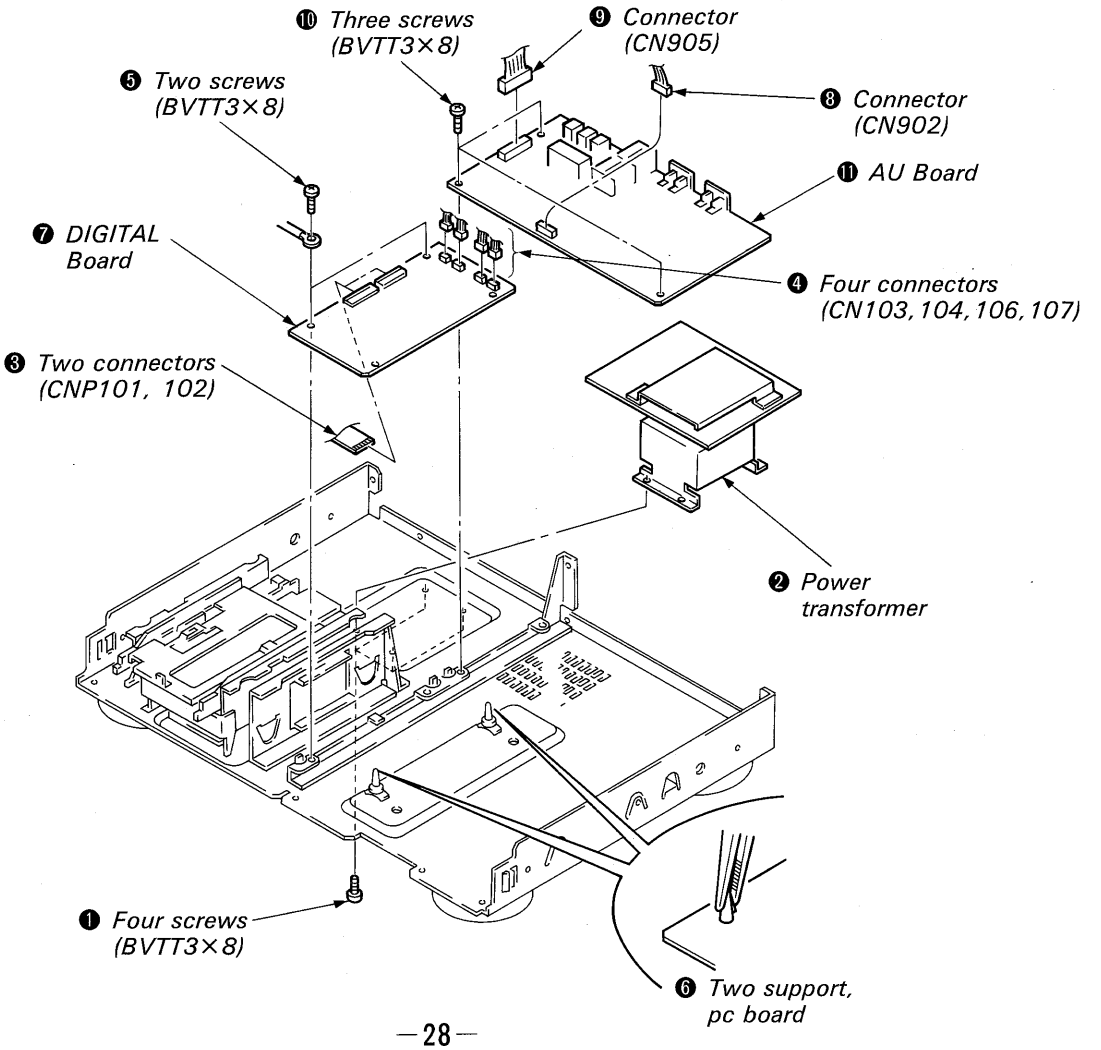
2-2. FRONT PANEL



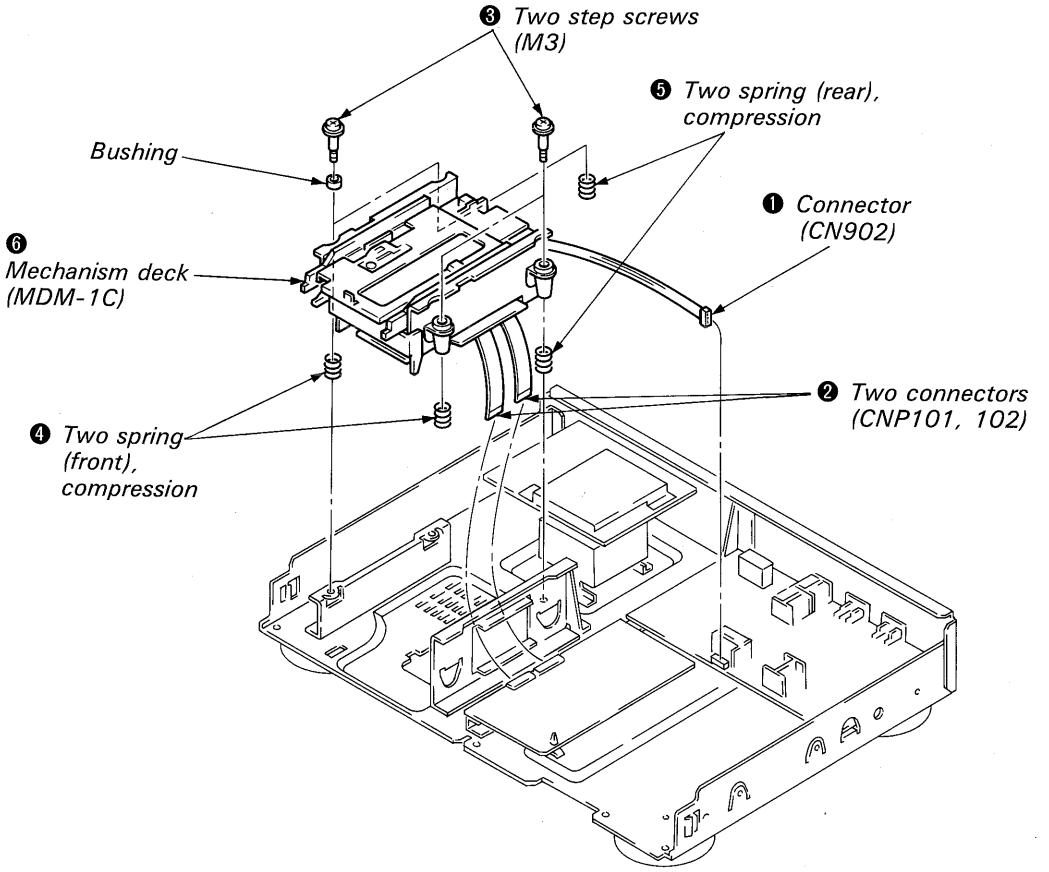
2-3. BACK PANEL



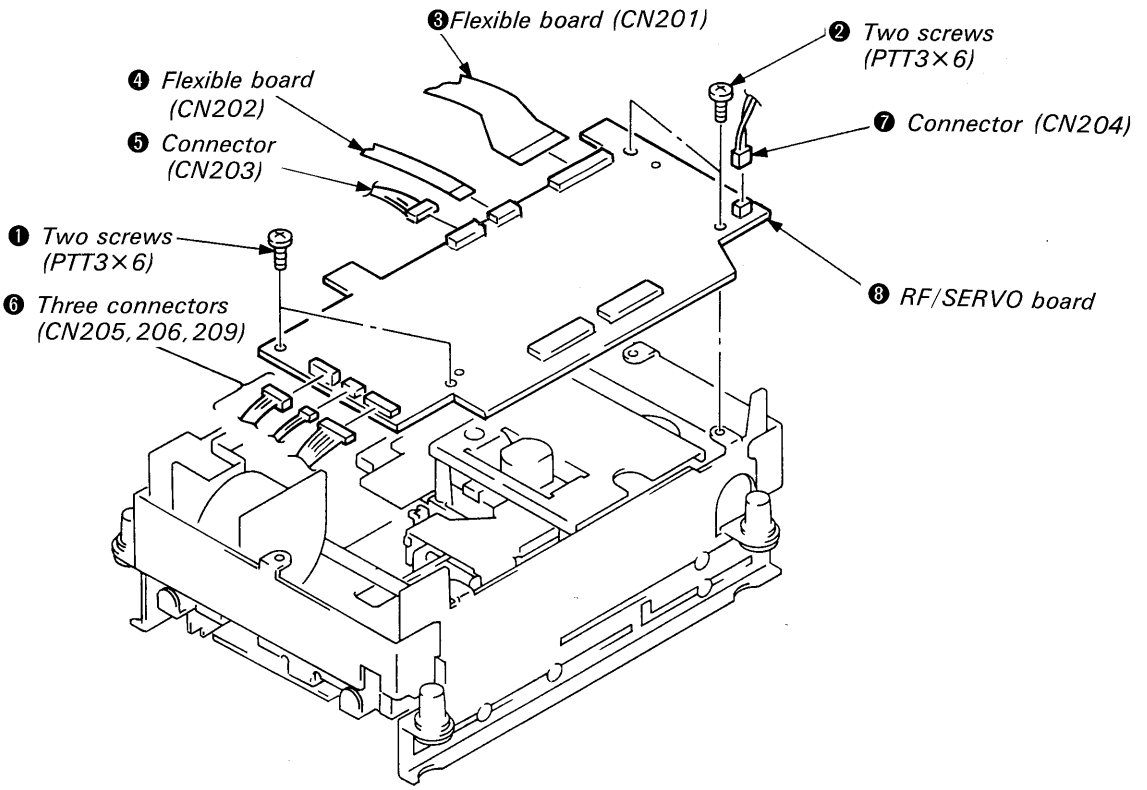
2-4. POWER TRANS, DIGITAL • AU BOARD


❿ Three screws (BVTT3×8)
❾ Connector (CN905)
❺ Two screws (BVTT3×8)
❽ Connector (CN902)
⓫ AU Board
❼ DIGITAL Board
❹ Four connectors (CN103, 104, 106, 107)
❸ Two connectors (CNP101, 102)
❷ Power transformer
❶ Four screws (BVTT3×8)
❻ Two support, pc board

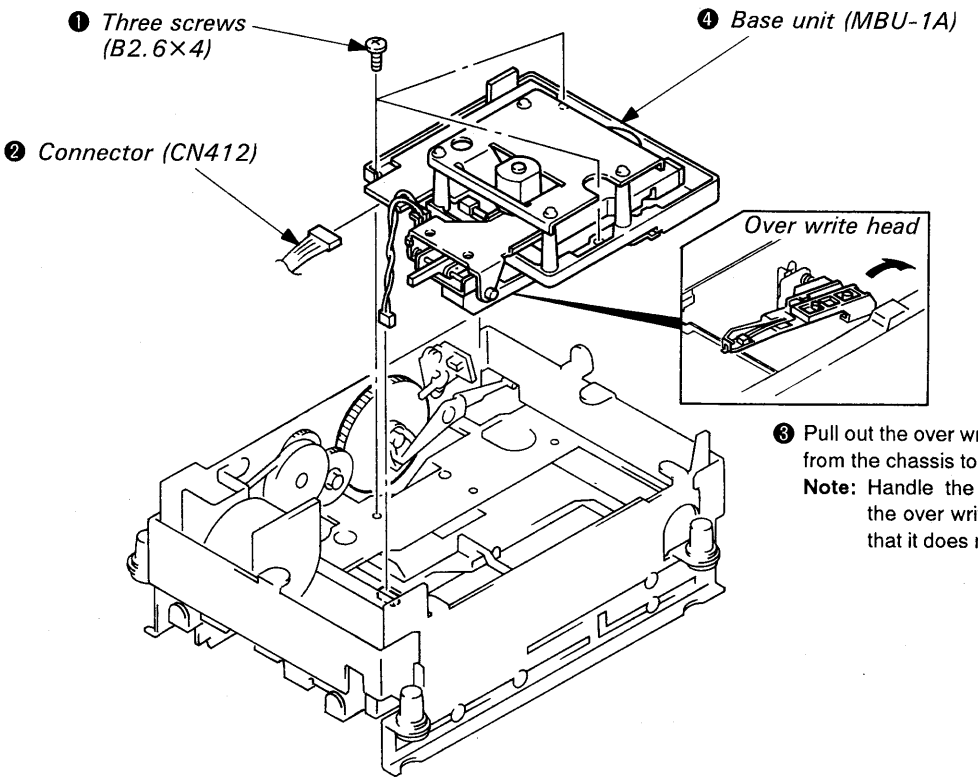
2-5. MECHANISM DECK (MDM-1C)


❸ Two step screws (M3)
❺ Two spring (rear), compression
Bushing
❶ Connector (CN902)
❻ Mechanism deck (MDM-1C)
❷ Two connectors (CNP101, 102)
❹ Two spring (front), compression

2-6. RF/SERVO BOARD



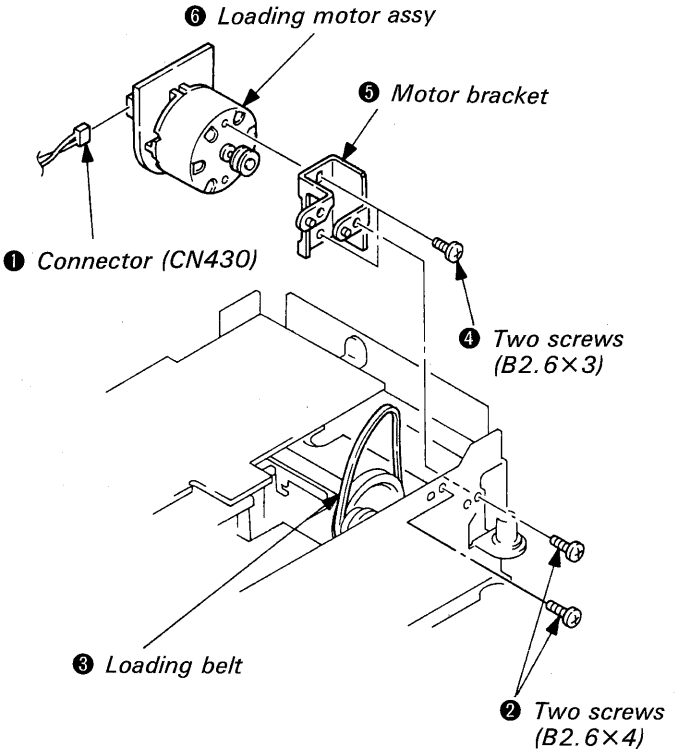
2-7. BASE UNIT (MBU-1A)



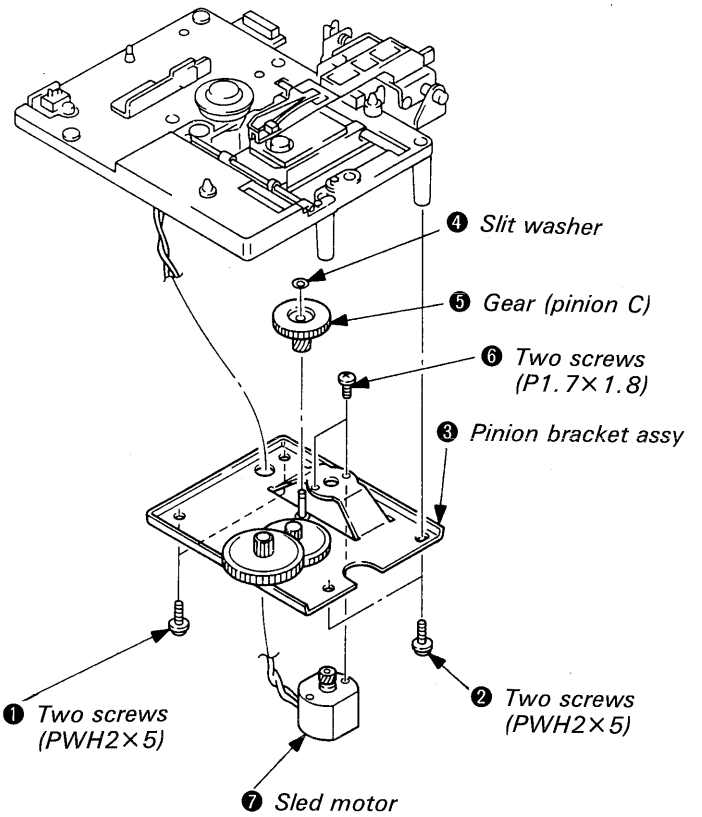
❸ Pull out the over write head section from the chassis to remove.

Note: Handle the magnetic head section of the over write head section carefully so that it does not change its shape, etc.

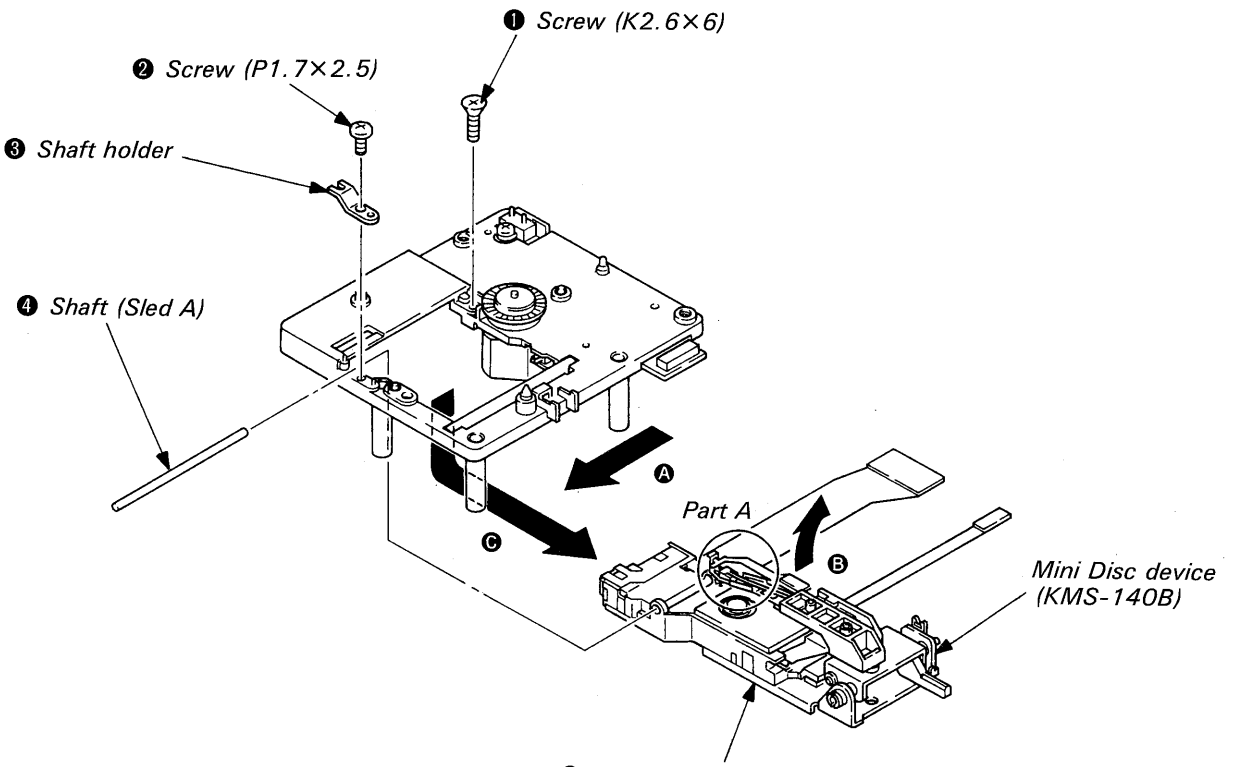
2-8. LOADING MOTOR ASSY



2-9. SLED MOTOR



2-10. MINI DISC DEVICE (KMS-140B)



❺ Slide the device in arrow direction Ⓐ.
❻ Lift up the over write head section slightly in arrow direction Ⓑ and remove the mini disc device in arrow direction Ⓒ.

Note: Handle the magnetic head section (part A) of the over write head section carefully so that it does not change its shape, etc.

SECTION 3
TEST MODE

3-1. TEST MODE SETTING

While pressing the ▶(PLAY) key, connect the power cord to the AC outlet, then release the ▶(PLAY) key.

3-2. TEST MODE RELEASING

Disconnect the power cord from the AC outlet.

3-3. TEST MODE OPERATION

[ ] represents main operations by each key.

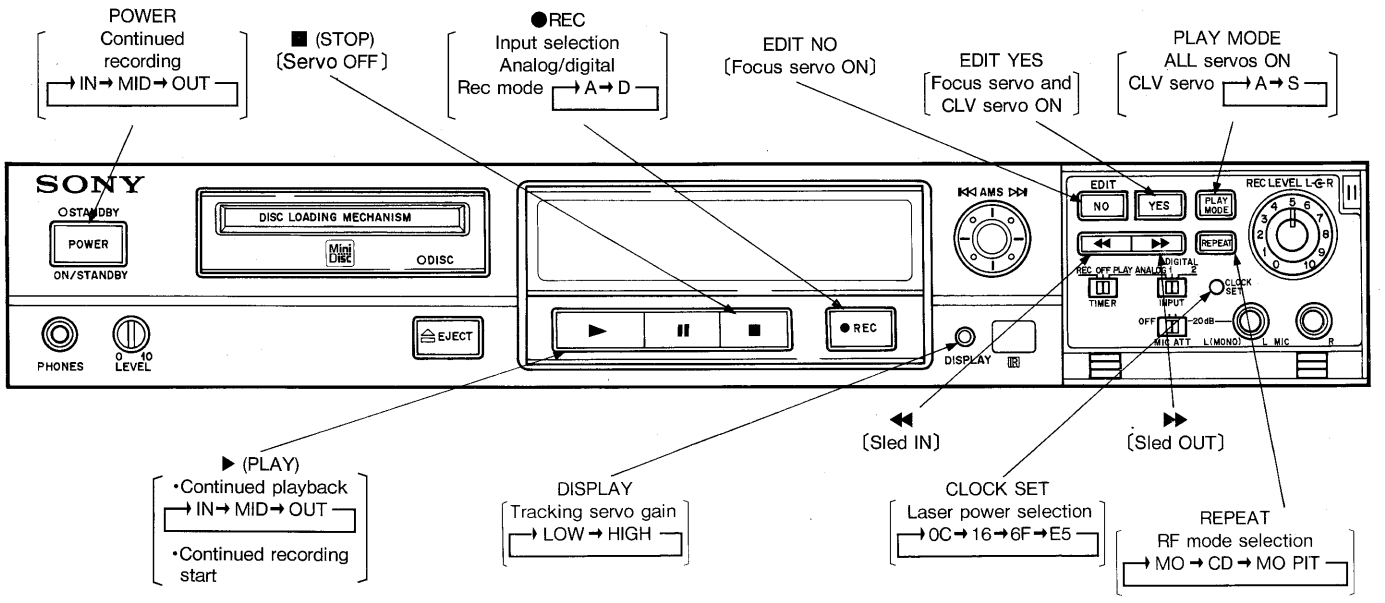


Fig. 3-1. Key arrangement

Key	Indication	Contents	Remarks
POWER	CREC-IN	Continued recording on inner circumference	• Indication changes as key is pressed. • After the indication shown in the left has appeared, repeated recording occurs at the indicated position by pressing ▶(PLAY) key. • To stop recording, press ■(STOP) key.
	CREC-MIDDLE	Continued recording on middle circumference	
	CREC-OUT	Continued recording on outer circumference	
CLOCK SET	Laser Power 0C	CD reading power	• Indication changes as key is pressed, laser power is switched and laser is emitted. • To stop the laser emission, press ■(STOP) key.
	Laser Power 16	MO reading power	
	Laser Power 6F	Laser power adjustment (3.5mV)	
	Laser Power E5	MO writing power (maximum generating power)	
DISPLAY	Trk Gain Hi	Tracking servo gain UP	• Indication changes as key is pressed, and the tracking servo gain is selected. • Normally low.
	Trk Gain Low	Tracking servo gain NORMAL	
REPEAT	RF mod=MO	RF mode : MO groove	Adjusted on the MO disc groove. • Indication changes as key is pressed, and the RF mode is selected.
	RF mod=CD	RF mode : CD	Adjusted on the CD disc.
	RF mod=MO pit	RF mode : MO pit	Adjusted on the MO disc pit.
⏏EJECT	OPEN	Disc ejection	
	CLOSE	Disc loading	
●REC	Rec mode-A	Operation mode of CXD2525R : analog	PLL master mode • Indication changes as key is pressed, and the input is selected. (analog/digital)
	Rec mode-D	Operation mode of CXD2525R : digital	PLL slave mode
◀◀	sled in	Sled is moved toward inner circumference.	• Sled moves during key is pressed, and stops when key is released.
▶▶	sled out	Sled is moved toward outer circumference.	
EDIT NO	Fcs on	Focus servo on	• Only focus servo is on by pressing key.
EDIT YES	Fcs ClvS on	Focus/spindle (S) servo on/tracking servo off	• Focus servo and spindle servo (S) are on by pressing key.
PLAY MODE	Fcs ClvATr on	Focus / spindle (A) / tracking servo on	• Indication changes as key is pressed, and each servo is on.
	Fcs ClvSTr on	Focus / spindle (S) / tracking servo on	
▶(PLAY)	C PLAY IN	Continued playback of inner circumference	• Indication changes as key is pressed, repeated recording occurs at the indicated position. • To stop the playback, press ■(STOP) key.
	C PLAY MID	Continued playback of middle circumference	
	C PLAY OUT	Continued playback of outer circumference	
■(STOP)	—	All servos off	

Table 3-1. Test mode operation

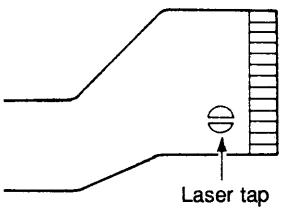
SECTION 4
ELECTRICAL ADJUSTMENTS

4-1. CAUTION ON LASER DIODE EMITTING CONFIRMATION

Never look the laser diode emission from right above when adjusting. It may cause loss of eyesight.

4-2. NOTE ON MiniDisc device (KMS-140B) HANDLING

The laser diode within the optical pickup is extremely subjected to electrostatic destruction. So, the laser tap on the flexible board should be bridge soldering when handling. Furthermore, take fully measurements against the electrostatic destruction. Take care of handling the flexible board because it can be damaged.



After replacing the MiniDisc device, perform adjustment and confirmation as follows.

- Temperature compensation offset adjustment
- Laser power adjustment
- MO groove traverse adjustment
- E-F balance adjustment
- MO pit traverse adjustment
- CD RF level adjustment
- CD traverse adjustment
- Error rate confirmation

4-3. NOTE ON ADJUSTMENT

1) Perform adjustment in the test mode.
   Release the test mode after adjustment.
2) Adjustment should be performed in order described.
3) Use jigs and measurement tools described below.

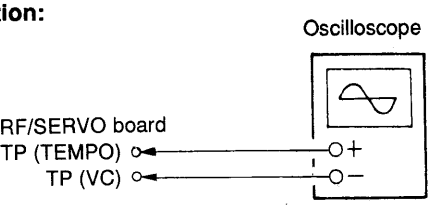
- CD test disc TGYS-1 (Part No.: 4-959-188-01)
- Continued recorded disc PTDM-1 (Part No.: J-2501-054-A)
- Laser power meter LPM-8001 (Part No.: J-2501-046-A)
- Error rate counter MDPE-1 (Part No.: J-2501-047-A)
- Oscilloscope (band more than 40 MΩ, Calibrate the probe before performing the measurement.)
- Digital volt meter
- Temperature meter

4-4. OFFSET ADJUSTMENT

Note: This adjustment should be performed immediately after setting the test mode. Performing other adjustments switch the operation mode, and the correct adjustment can not be performed.

1) Temperature compensation offset adjustment

Connection:



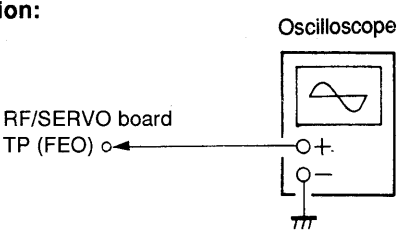
Adjustment method:

1. Connect the oscilloscope to TP (TEMPO) and TP (VC) on the RF/SERVO board.
2. Adjust RV208 on the RF/SERVO board so that the reading on the oscilloscope meets the specification.

   Specification: 0±20mV (25°C)
   +8.4mV/°C (Increased by 8.4mV with every increasing temperature by 1°C)

2) Focus bias offset adjustment

Connection:

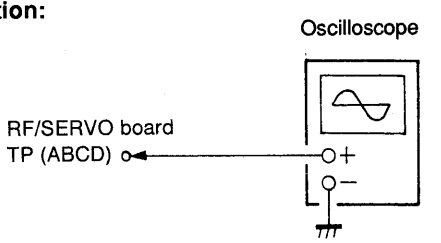


Adjustment method:

1. Connect the oscilloscope to TP (FEO) on the RF/SERVO board.
2. Adjust RV206 on the RF/SERVO board so that the reading on the oscilloscope becomes −230±30mV.

3) FOK offset adjustment

Connection:

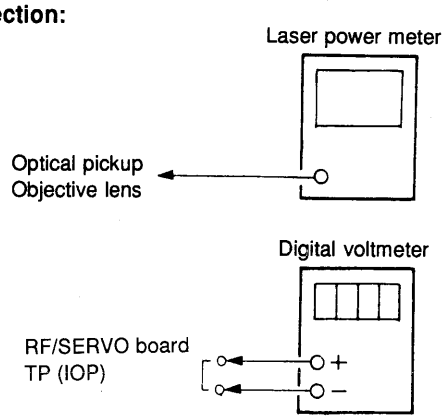


Adjustment method:

1. Connect the oscilloscope to TP (ABCD) (IC201 ㉝) on the RF/SERVO board.
2. Adjust RV205 on the RF/SERVO board so that the reading on the oscilloscope becomes 0±20mV.

4-5. LASER POWER ADJUSTMENT

Connection:



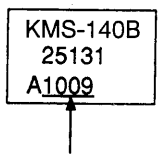
Adjustment method:

1. Place the laser power meter on the objective lens of the optical pickup. (If setting can not be made correctly, move the optical pickup using the ▶▶ or ◀◀ key.)
   Connect the digital voltmeter to TP (IOP) on the RF/SERVO board.
2. Press the CLOCK SET key to let "Laser Power 6F" appear. (laser power : for adjustment)
3. Adjust RV207 on the RF/SERVO board so that the reading on the laser power meter becomes 3.4±0.1mW.
4. Press the CLOCK SET key to let "Laser Power E5" appear. (laser power : MO writing)
5. At this time, confirm that the reading on the laser power meter, digital voltmeter meet the specifications shown below.

   Specifications:

   Laser power meter : $7.0\ ^{+0.2}_{-0.4}$ mW
   Digital voltmeter : Optical pickup reading ±3mA

   (Optical pickup level)

   In this case : Iop=100.9mA
   Iop (mA)=Digital voltmeter reading (mV) / 1(Ω)

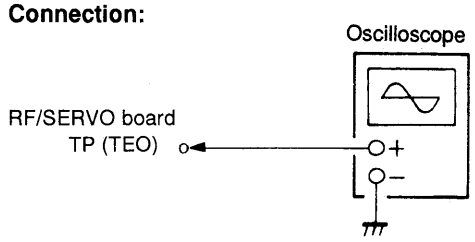
6. Press the CLOCK SET key to let "Laser Power 16" appear. (laser power : MO reading)
7. At this time, confirm that the reading on the laser power meter and digital voltmeter become the specifications shown below.

   Specifications :
   Laser power meter : 0.85±0.08mW
   Digital voltmeter : 42±5mA

8. Press the ■(STOP) key to stop the laser emitting.

4-6. MO TRAVERSE ADJUSTMENT

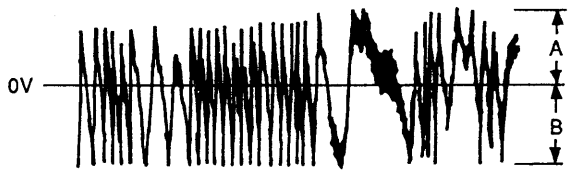
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (TEO) on the RF/SERVO board.
2. Insert a MO disc (standard product).
3. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
4. Move the optical pickup from pit to outer circumference by pressing the ◀◀ or ▶▶ key.
5. Press the EDIT YES key. (Focus/spindle (S) servo on, tracking servo off)
6. Adjust the RV204 on the RF/SERVO board so that the waveform of the oscilloscope meets the specification. (MO groove traverse adjustment)

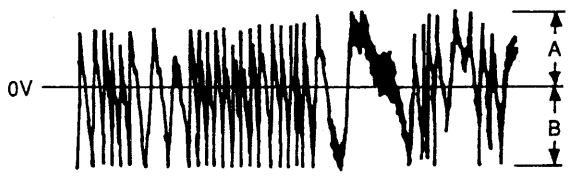
(Traverse waveform)



Specification: A=B

7. Press the CLOCK SET key to let "Laser Power E5" appear. (laser power : MO writing)
8. Adjust the RV201 on the RF/SERVO board so that the waveform of the oscilloscope meets the specification. (E-F balance adjustment)

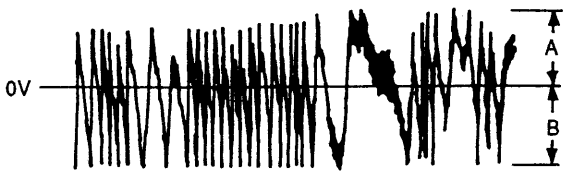
(Traverse waveform)



Specification: A=B

9. Press the CLOCK SET key to let "Laser Power 16" and "Laser Power E5" appear alternatively, and repeat adjustment until both offset values meet the specifications.
10. Press the ■(STOP) key.
11. Move the optical pickup to the pit portion (inner most circumference) by pressing ◀◀ key.
12. Press the REPEAT key to let "RF mod=MOpit" appear. (RF mode : MO Pit)
13. Press the EDIT YES key. (Focus/spindle (S) servo on, tracking servo off)
14. Adjust the RV203 on the RF/SERVO board so that the waveform of the oscilloscope meets the specification. (MO pit traverse adjustment)

(Traverse waveform)

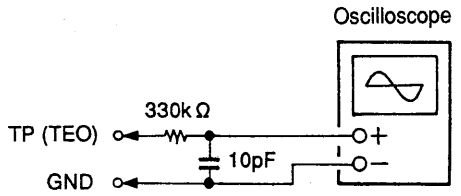


Specification: A=B

15. Press the ■(STOP) key.
16. Press the ⏏EJECT key to take out the MO disc.

Note 1: If a recorded disc is used for this adjustment, the data is erased when MO writing.

Note 2: If it is hard to observe the traverse waveform, connect the oscilloscope as shown below. The appearance is improved.

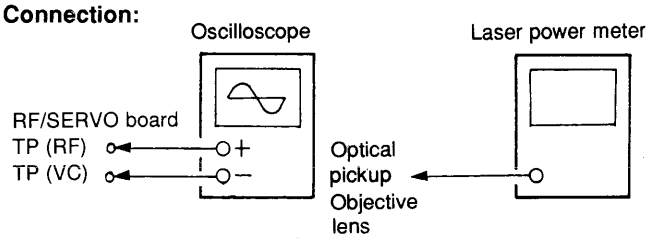


4-7. CD RF LEVEL ADJUSTMENT

Condition:

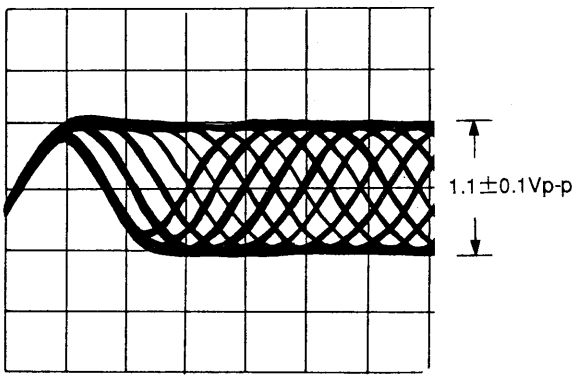
Perform adjustment in the condition where the unit is in horizontal.

Connection:



Adjustment method:

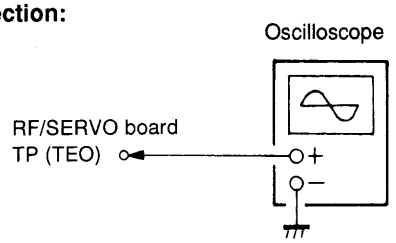
1. Connect the Oscilloscope to TP (RF) and TP (VC) on the RF/SERVO board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to perform repeated playback.
5. Adjust the RV211 on the RF/SERVO board so that the RF level of the oscilloscope becomes 1.1± 0.1Vp-p.



6. Press the ■(STOP) key to stop playback.
7. Press the ⏏EJECT key to take out the test disc.
8. Place the laser power meter on the objective lens of the optical pickup. (If setting can not be made correctly, move the optical pickup using ▶▶ or ◀◀ key.)
9. Press the CLOCK SET key to let "Laser Power 0C" appear. (laser power : CD reading)
10. Confirm that the reading of the laser power meter is 0.49±0.1mW.
11. Press the ■(STOP) key to stop laser diode emitting.

4-8. CD TRAVERSE ADJUSTMENT

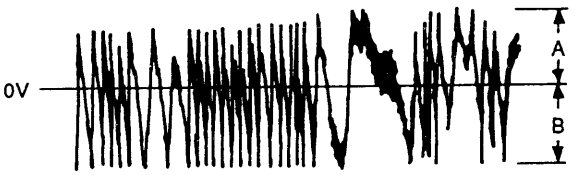
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (TEO) on the RF/SERVO board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod= CD" appear. (RF mode : CD)
4. Press the EDIT YES key. (Focus/spindle (S) servo on, tracking servo off)
5. Adjust the RV202 on the RF/SERVO board so that the reading on the oscilloscope meets the specification.

(Traverse waveform)

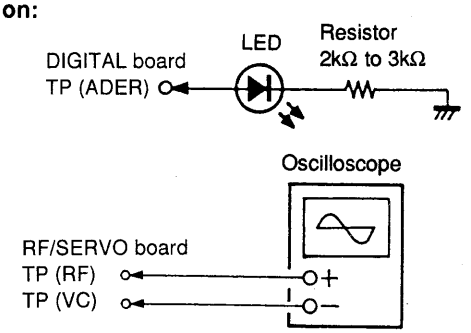


Specification: A=B

6. Press the ■(STOP) key.
7. Press the ⏏EJECT key to take out the test disc.

4-9. MO FOCUS BIAS ADJUSTMENT

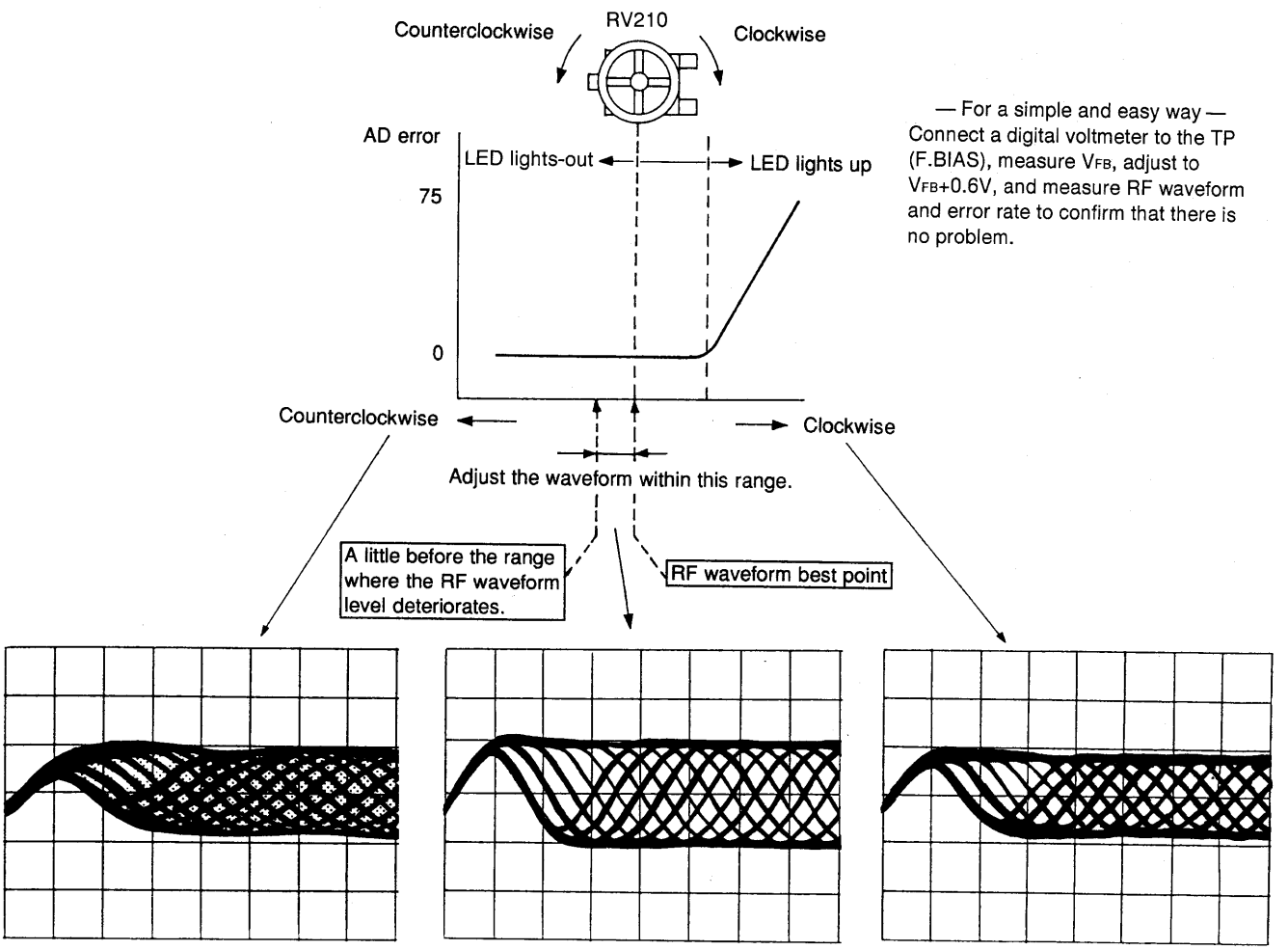
Connection:



Adjustment method:

1. Connect the LED and resistor (2k to 3kΩ) to TP (ADER) on the DIGITAL board.
2. Connect the Oscilloscope to TP (RF) and TP (VC) on the RF/SERVO board.
3. Insert the continued recorded disc PTDM-1.
4. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
5. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
   (Performing adjustment about two minutes after ▶(PLAY) key is pressed allows more accurately adjustment since the adjustment is performed at the continued recording portion.)
6. Adjust the RV210 on the RF/SERVO board so that the eye-pattern of the oscilloscope correctly appears. (rough adjustment)
   (The correct eye-pattern means that ◇ shape can be identified clearly at the center of waveform.)
7. While monitoring the LED connected to the DIGITAL board and the RF waveform of the oscilloscope, adjust the RV210 so that "AD error best point" is obtained. (fine adjustment)
   (The "AD error best point" is a point where the RF waveform does not deteriorate and the LED connected to the DIGITAL board does not light up or lights up once a ten seconds by turning the RV210 from the point where the LED lights up to pass the best point a little.)
8. Press the ■(STOP) key to stop the playback.
9. Press the ⏏EJECT key to take out the continued recorded disc.

Normally, a relation between the RF waveform and AD error is as follows.

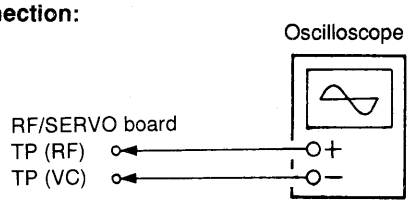


— For a simple and easy way —
Connect a digital voltmeter to the TP (F.BIAS), measure V_{FB}, adjust to V_{FB}+0.6V, and measure RF waveform and error rate to confirm that there is no problem.

4-10. CD FOCUS BIAS ADJUSTMENT

Method requiring no error rate counter

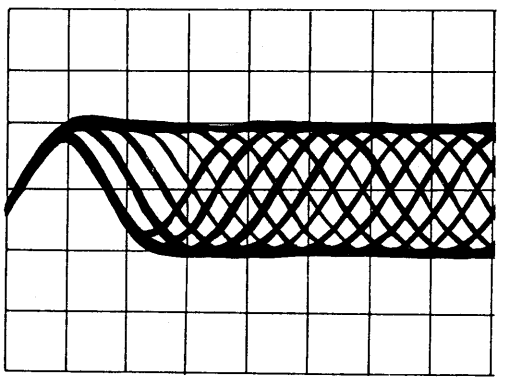
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (RF) and TP (VC) on the RF/SERVO board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to perform repeated playback.
5. Adjust the RV209 on the RF/SERVO board so that the eye-pattern of the oscilloscope correctly appears.
   (The correct eye-pattern means that ◇ shape can be identified clearly at the center of waveform.)

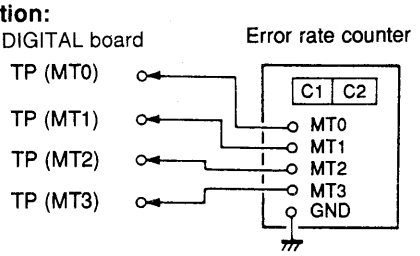
An example of RF waveform



6. Press the ■(STOP) key to stop the playback.
7. Press the ⏏EJECT key to take out the test disc.

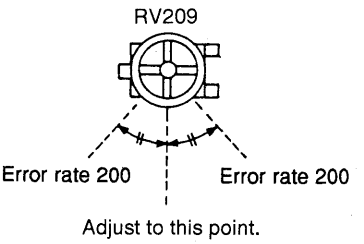
Method requiring error rate counter

Connection:



Adjustment method:

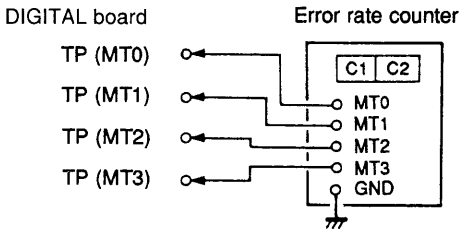
1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
5. Turn the RV209 on the RF/SERVO board so that the error rate (C1) of the error rate counter becomes 200 at two points. Measure these two points and adjust the RV209 to the mechanical center.



6. Press the ■(STOP) key to stop the playback.
7. Press the ⏏EJECT key to take out the test disc.

4-11. ERROR RATE CONFIRMATION

Connection:



CD error rate confirmation:

1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
5. Confirm that the error rate (C1) of the error rate counter is less than 20.
6. Press the ■(STOP) key to stop the playback.
7. Press the ⏏EJECT key to take out the tset disc.

MO repeated recording disc making:

1. Insert a standard product MO disc (blank disc).
2. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
3. Press the ▶▶key to move the optical pickup to outer circumference.
4. Press the POWER key to let "CREC-MIDDLE" appear. (middle circumference continued recording)
5. Press the ▶(PLAY) key to start recording. (End the recording within one minute.)
6. Press the ■(STOP) key to stop the recording.
7. Press the ⏏EJECT key to take out the test disc.

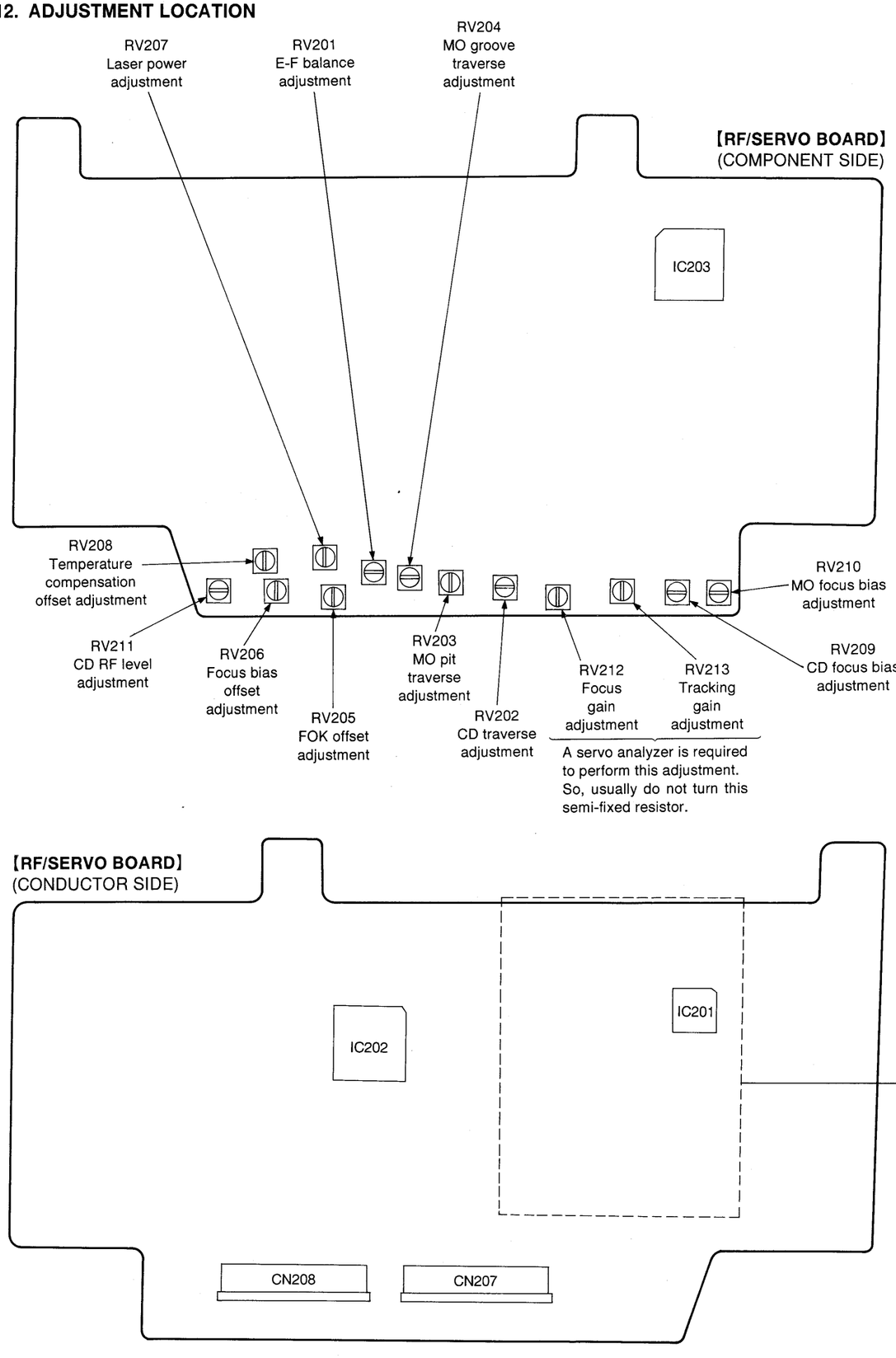
Performing these steps described above permits continued recorded disc for MO error rate confirmation.

MO error rate confirmation:

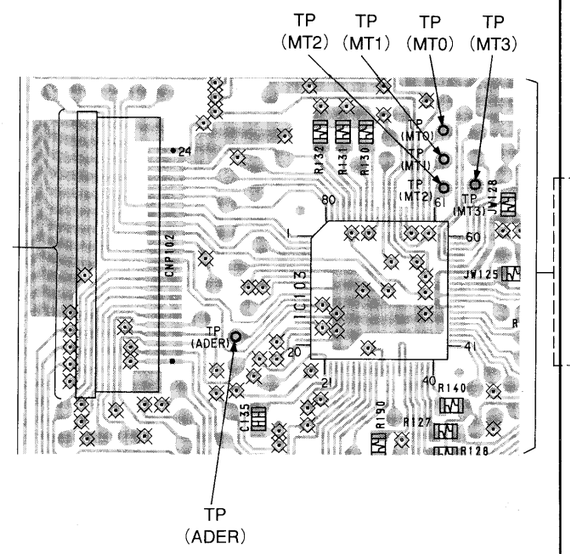
Note: Be sure to use the disc (self recorded/played back) made in above steps.

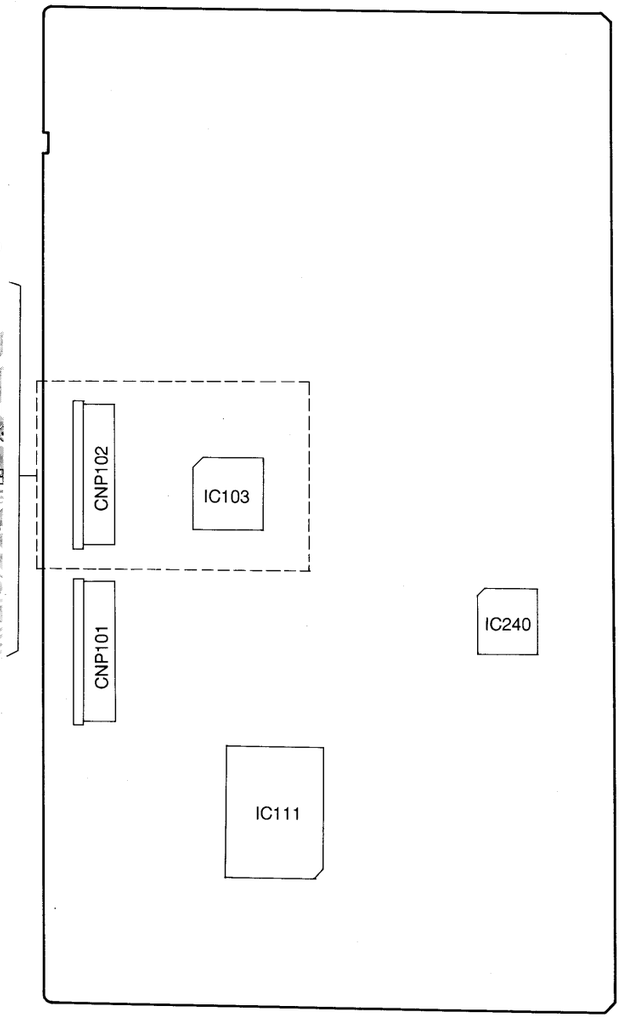
1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the continued recorded disc made in above steps.
3. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
4. Press the ▶▶key to move the optical pickup to outer circumference.
5. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference continued playback)
6. Confirm that the error rate (C1) of the error rate counter is less than 50.
7. Press the ■(STOP) key to stop the playback.
8. Press the ⏏EJECT key to take out the test disc.

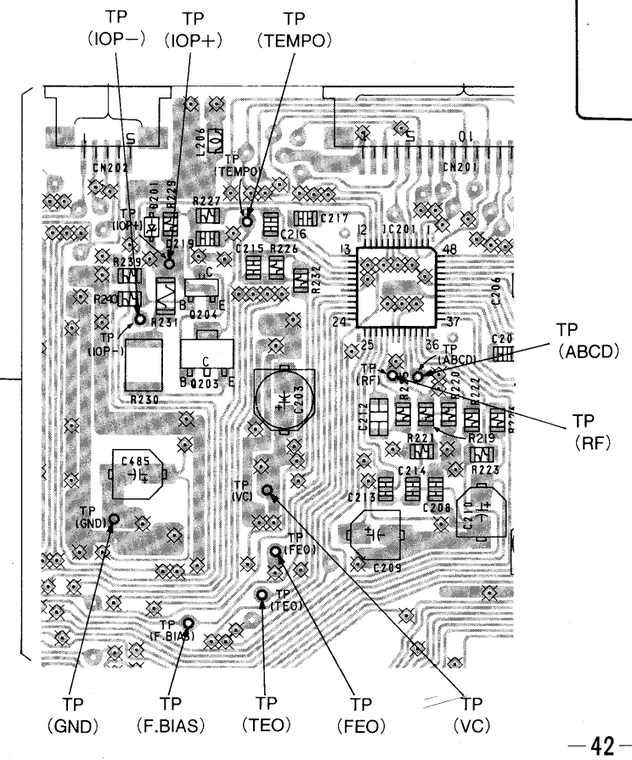
4-12. ADJUSTMENT LOCATION



【DIGITAL BOARD】 (COMPONENT SIDE)







SECTION 5
DIAGRAMS

5-1. IC PIN FUNCTIONS

•IC103 EFM/ACIRC ENCODER/DECODER (CXD2525R) ***(3) of I/O is state output and (A) is analog output.**

Pin Name	Signal Name	I/O	Function
1	MDP	O (3)	Spindle motor servo control
2	MDS	O (3)	Spindle motor servo control
3	EFMI	I	Playback EFM input
4	ASY	O	Playback EFM full-swing output
5	LOCK	O	Spindle servo (CLV) lock state monitor. Locks at "H".
6	VCOO	O	EFM decoder analog PLL oscillation output (196Fs=8.6436 MHz)
7	VCOI	I	EFM decoder analog PLL oscillation input (196Fs=8.6436 MHz)
8	TEST1	I	Test pin. Normally GND.
9	PDO	O (3)	EFM decoder analog PLL phase comparison output
10	VSS	–	Digital GND
11	EFMO	O	EFM output during recording
12	ATER	O	ADIP CRC flag output. "H" when error.
13	CNIN	I	Track jump number count signal input
14	SENS	O (3)	Internal status output pin for the serial bus address
15	SYPL	I	SQSY, ADSY, DQSY, MQSY polarity switching input pin. Active high when "H".
16	FILO	O (A)	Digital PLL master PLL filter output
17	FILI	I	Digital PLL master PLL filter input
18	PCO	O (3)	Digital PLL master PLL phase comparison output
19	AVSS	–	Analog GND
20	CLTV	I	Digital PLL master PLL VCO control voltage input
21	AVDD	–	Analog power supply
22	XRST	I	System reset input. Active low
23	REC	I	Decoder when "L" and encoder when "H"
24	TEST8	I	Test pin. Normally GND
25	SCLK	I	Serial bus clock input
26	XLAT	I	Serial bus latch input
27	SWDT	I	Serial bus writing data input
28	SRDT	O (3)	Serial bus reading data output
29	ADSY	O	ADIP sync output
30	SQSY	O	Sub code Q sync output
31	VDD	–	Digital power supply
32	DQSY	O	Sync (SCOR) output of sub code Q of the digital in U-bit CD format
33	TEST7	O	Open
34	DTI	I	Recording audio signal input
35	DTO	O (3)	Playback audio signal output. High impedance during recording
36	C2PO	O	PLayback: C2PO. Digital REC: D, In-VFLAG. Analog REC: 0
37	BCK	O	2.8224 MHz output (MCLK system)
38	XBCK	O	BCK reverse output (MCLK system)
39	LRCK	O	44.1 kHz (=Fs) (MCLK system)
40	WDCK	O	88.2 kHz (MCLK system)

Pin Name	Signal Name	I/O	Function
41	FS4	O	176.4 kHz (MCLK system)
42	GTOP	O	Opens the sync protection window when "H" (INPUT EFM SYNC monitor output)
43	XUGFS	O	Unguarded frame sync at "L" (INPUT EFM SYNC monitor output)
44	XPLCK	O	EFM decoder PLL clock output (98Fs=4.3218MHz)
45	GFS	O	Frame sync OK at "H" (INPUT EFM SYNC monitor output)
46	EPDO	O (3)	EFM encoder external PLL phase comparison output. Freq.: low → "H"
47	RFCK	O	7.35 kHz output (MCLK system)
48	EVCI	I	EFM encoder external PLL oscillation input (196 Fs=8.6436 MHz)
49	EVCO	O	EFM encoder external PLL oscillation output (196 Fs=8.6436 MHz)
50	VSS	–	Digital GND
51	MCLK	O	22.579 MHz output. Duty will not be protected.
52	XTAI	I	Crystal oscillation input (512 Fs=22.5792 MHz)
53	XTAO	O	Crystal oscillation output (512 Fs=22.5792 MHz)
54	TEST9	I	Fixed at "L"
55	MVCI	I	Digital-in PLL oscillation input (512 Fs=22.5792 MHz)
56	MVCO	O	Digital-in PLL oscillation output (512 Fs=22.5792 MHz)
57	TEST2	O	Fixed at "Open"
58	DIPD	O (3)	Digital PLL phase comparison output. Freq.: low → "L"
59	RAOF	O	RAM overflow output (Monitor output of decoder)
60	MT3	O	Playback corrected state monitor output
61	MT2	O	Playback corrected state monitor output
62	MT1	O	Playback corrected state monitor output
63	MT0	O	Playback corrected state monitor output
64	WFCK	O	7.35 kHz output (EFM decoder PLL system during playback, EFM encoder PLL system during recording)
65	DIN	I	Digital audio input pin
66	MD2	I	Digital audio out ON/OFF pin. ON when "H"
67	DOUT	O	Digital audio output pin
68	DIDT	O	Audio data output pin of the digital audio input pin
69	DODT	I	16-bit data input pin for the digital audio output
70	DOVF	I	Validity flag input pin for the digital audio
71	VDD	–	Digital power supply
72	TEST3	I	Fixed at "L"
73	TEST4	O	Fixed at "Open"
74	TEST5	I	Fixed at "L"
75	TEST6	I	Fixed at "L"
76	FMCK	I	ADIP reading clock input (6.3 kHz) (TTL Schmidt input)
77	FMDT	I	ADIP data input (TTL Schmidt input)
78	ADFG	I	ADIP carrier signal input (20.05 kHz) (TTL Schmidt input)
79	FSW	O (3)	Spindle motor output filter switching output. "Z" when CLV-P. Others: "L"
80	NON	O	Spindle motor ON/OFF control output. ON when "H"

Note:
- XUGFS is a frame sync obtained from the EFM signal and is a negative pulse. Signal before sync protection.
- PLL is made for XPLCK so that changes in the reversion and falling edge of the EFM PLL clock and the EFM signal match.
- The GFS signal becomes "H" when the frame sync and interpolation protection timing match.
- C2PO is a signal which shows the error state of the data.
- RAOF is a signal generated when the 32K RAM exceeds the ± 4F jitter margin.

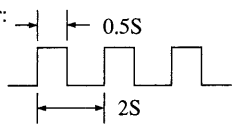
•IC110 SHOCK PROOF MEMORY CONTROLLER (CXD2526AR)

Pin Name	Signal Name	I/O	Function
1	A16	O	When RMSL is H: SRAM address bus A16. When RMSL is L: WFOVF (Note)
2	A17	O	When RMSL is H: SRAM address bus A17. When RMSL is L: WDTM (Note)
3	A18	O	When RMSL is H: SRAM address bus A18. When RMSL is L: ZERO (Note)
4	A19	O	When RMSL is H: SRAM address bus A19. When RMSL is L: MDTSC (Note)
5	A20	O	When RMSL is H: SRAM address bus A20. When RMSL is L: CMPSY (Note)
6	LRCK	I	LRCK input from the EFM encoder/decoder
7	BCK	I	BCK input from the EFM encoder/decoder
8	C2PO	I	C2PO input from the EFM decoder
9	DATA	I/O	Input/output data from the decoder during playback and that to the encoder during recording
10	VSS	—	GND
11	TEST	I	Test pin. Normally fixed at "L"
12	XRST	I	Reset input. Resets when "L"
13	DFCT	I	Pin for DFCT signal input from CXA1082BQ
14	SRDT	(HiZ) O	Microprocessor serial data output pin "Hi-z" when the CXD2526AR read register is not selected
15	SWDT	I	Microprocessor serial data input pin
16	XSLT	I	Microprocessor serial data latch signal input pin
17	SCK	I	Microprocessor serial data shift clock input pin
18	SCTX	I	Data output enable signal input pin in the recording mode
19	RCPB	I	"L": Playback mode, "H": Recording mode
20	WRMN	I	"H": Write mode, "L": Monitor mode
21	SBMN	I	"H": Records the input signal according to the SDCT. "L": Records according to the DCT
22	XINT	O	Interrupting request output pin. "L" When the interrupting status is generated
23	MDSY	O	Input data MD sync detection signal
24	MEMFUL	O	"H" when the main data area is full with data
25	MEMEMP	O	"H" when the main data area is empty
26	UNDER	O	"H" when RMS $<$ THUND
27	OVER	O	"H" when RMS $\geqq$ THOVR
28	ERWR	O	"H" when the data which C2PO is effective is written in the RAM
29	BTOV4	O	"H" when BCT $\geqq$ 400 (Hex)
30	TXST	O	"H" when data is transmitted
31	VDD	—	System power supply
32	BUSY	I/O	"H" when RAM is accessed
33	ZZ2	I	Test signal. Fixed at "L"
34	ZZ1	I	Test signal. Fixed at "L"
35	ZZ0	I	Test signal. Fixed at "L"
36	XALT	O	Data ready or latch signal to CXD2531BR
37	ADTI	I	Pin for data input from CXD2531BR
38	ADTO	O	Pin for data output to CXD2531BR
39	ACK	O	Pin for data input/output clock output to CXD2531BR
40	AC2	O	Pin for output data C2PO output to CXD2531BR
41	XRQ	I	Pin for data request signal input from CXD2531BR
42	SDCK	I	External sub data I/F shift clock input
43	SBDT	I/O	External sub data I/F data output pin in the playback mode and the data input pin in the recording mode
44	XWT	O	External sub data I/F wait signal. Must not transmit the clock for reading the new data at "L"
45	SRDY	O	External sub data I/F access permission signal. Ignores the clock for sub data R/W if it is transmitted at "H"

Pin Name	Signal Name	I/O	Function
46	MCK	O	128 fs output pin
47	F256	O	256 fs output pin
48	XTLO	O	System clock output pin (22.5792 MHz)
49	XTLI	I	System clock input pin (22.5792 MHz)
50	VSS	–	GND
51	CKSL	I	Fixed at "L"
52	RMSL	I	External RAM select pin. "H": SRAM. "L": DRAM
53	ERR	I/O	C2PO input/output pin when EXTC2R is "H"
54	D7	O	SRAM data line D7 when RMSL is "H". Test signal when "L".
55	D4	I/O	RAM data bus D4 when RMSL is "H". Test signal when "L"
56	D0	I/O	RAM data bus D0
57	D1	I/O	RAM data bus D1
58	D3	I/O	RAM data bus D3
59	D2	I/O	RAM data bus D2
60	XCAS	I/O	DRAM $\overline{CAS}$ output when RMSL is "L". Data bus D6 when "L"
61	XOE	O	RAM output enable
62	A10	O	RAM address bus A10
63	XWE	O	RAM write enable
64	XRAS	I/O	DRAM $\overline{RAS}$ output when RMSL is "L". Data bus D5 when "H"
65	A11	O	RAM address bus A11
66	A9	O	RAM address bus A9
67	A0	O	RAM address bus A0
68	A1	O	RAM address bus A1
69	A2	O	RAM address bus A2
70	A3	O	RAM address bus A3
71	VDD	O	System power
72	A8	O	RAM address bus A8
73	A7	O	RAM address bus A7
74	A6	O	RAM address bus A6
75	A5	O	RAM address bus A5
76	A4	O	RAM address bus A4
77	A12	O	RAM address bus A12 when RMSL is "H". CS output when "L"
78	A13	O	RAM address bus A13 when RMSL is "H". SYOK output when "L"
79	A14	O	When RMSL is H: SRAM address bus A14. When RMSL is L: WFFUL (Note)
80	A15	O	When RMSL is H: SRAM address bus A15. When RMSL is L: RFEMP (Note)

Note: WFFUL: Becomes "H" when the writing FIFO becomes full.
RFEMP: Becomes "H" when the reading FIFO becomes empty.
WFOVF: Becomes "H" when the writing FIFO becomes overfolw.
WDTM: Outputs the window timing inside the D1 clock.
ZERO: Outputs "H" when BCT is 0.
MDTSC: Becomes "H" when the input data header selector is 00 to IF and "L" at other times.
CMPSY: Interpolation sync timing.

•IC111 SYSTEM CONTROL MICROPROCESSOR (M38067MC-070FP)

Pin Name	Signal Name	I/O	Function
1	ERROR	I	Error mute input from IC210 (CXD8495Q) "H": Digital in UNLOCK
2	LAT-2	O	Latch output to IC260 (CXD8482Q)
3	LAT-1	O	Latch output to IC220 (CXD2567M)
4	U/J	I	Model selection port US, Canadian models: Fixed at "H" AEP, UK, Singapore, Tourist models: Fixed at "L"
5	ATT	O	Serial data output to IC220 (CXD2567M), IC260 (CXD8482Q) and IC512 (CXD2564AM)
6	LATCH	O	Latch output to IC512 (CXD2564AM)
7	SHIFT	O	Serial clock output to IC220 (CXD2567M), IC260 (CXD8482Q) and IC512 (CXD2564AM)
8	XLAT	O	Latch output to the serial bus
9	SCLK	O	Clock output to the serial bus
10	SWDT	O	Write data output to the serial bus
11	SRDT	I	Read data input from the serial bus
12	APCREF	O	Reference voltage output of the laser power Four levels: OFF, CD, MO READ, MO WRITE
13—15	——	I	Not used this set (Fixed at "H")
16	ADSY	I	ADIP sync input "L" every 13.3msec Almost "H"
17	SQSY	I	Sub-code Q sync input "L" every 13.3msec Almost "H"
18	DQSY	I	U-bit CD format sub-code Q sync of digital in "L" every 13.3msec Almost "H"
19	SENS	I	Status input from the serial bus
20	MINT	O	Request for temporary interruption of communication with the master microprocessor (IC301) The master microprocessor (IC301) does not send the clock during "H"
21	CLK	I	Communication clock input from the master microprocessor (IC301)
22	TXD	O	Serial data output to the master microprocessor (IC301)
23	RXD	I	Serial data input from the master microprocessor (IC301)
24	XINT	I	Request for interruption from the shock proof memory controller (IC110)
25	JUMP PULSE	I	Signal from the track-jump detection circuit 1 pulse is output every 1 track
26	CNVSS	—	Mode setting pin at power start-up (Fixed at "L")
27	RESET	I	Reset input "H" after several hundred msec of "L" after power start-up
28	TEST	I	Test input "H": Test mode, "L": Normal mode (Fixed at "L")
29	——	I	Not used this set (Fixed at "H")
30	XIN	I	Clock input (6MHz)
31	XOUT	O	Clock output (6MHz)
32	VSS	—	Ground terminal
33	D-RST	O	Reset output to IC103 (CXD2525R) and IC110 (CXD2526AR) The reset is output after 512fs is stable
34	A-RST	O	Reset output to IC512 (CXD2564AM)
35	——	I	Not used this set (Fixed at "H")
36	ALLD	O	APCREF/CONSTANT selection When CD playback power: "L" When MO playback power: "H"
37	RMS	O	Laser modulation selection When playback power: "L" When stop: "H" When recording power: 
38	LOAD IN	O	Loading motor (M401) control output * 1
39	LOAD OUT	O	Loading motor (M401) control output * 1
40	PIT/GROOVE	I	PIT/GROOVE detection input "H": Disc for playing and TOC area

Pin Name	Signal Name	I/O	Function
41	C. OUT	I	Track number counting signal input
42	DIRC	O	Output pin for IC202 (CXA1082BQ) during 1 track jump
43	AGCTC	O	AGC time constant selection "L": Focus searching and power selection
44	DFCTSW	O	Defect ON/OFF selection
45	FOK	I	Focus OK signal input "H" is output when the focus is applied
46	CD/MO	I	CD/MO discrimination signal input
47	RFSW1	O	Disc mode selection "H": PIT, "L": GROOVE
48	RFSW0	O	Disc mode selection "H": High reflection rate disc, "L": Low reflection rate disc
49	MAGUP	O	Not used this set (Fixed at "H")
50	MGSERVO	O	Not used this set (Fixed at "H")
51	——	I	Not used this set (Fixed at "H")
52	CARTRIG	I	Not used this set (Fixed at "H")
53	DSCPRO	I	REC proof detection input "H": Protect
54	RFLCT	I	Disc reflection rate detection input "H": Low reflection rate disc
55	LIMIT IN	I	Limit in switch input "L": Sled limit in
56	INSW	I	Loading in switch input "L" at the position where the head descends Others: "H"
57	OUTSW	I	Loading out switch input "L" at the position of load out Others: "H"
58	SLEN	O	Sled servo ON/OFF control output Normally, the LOCK of pin ⑦② is output
59	FBC	O	Focus bias control output
60	MNSB	O	Main/sub-data counter selection output to the shock proof memory controller (IC110)
61	WRMN	O	Write/monitor mode selection output to the shock proof memory controller (IC110)
62	INSL	I	Not used this set (Fixed at "L")
63	HELP (A)	I	Not used this set (Fixed at "H")
64	XAMUTE	O	Digital output V flag control output to IC103 (CXD2525R) The inverted AMUT of pin ⑥⑤ is output
65	AMUT	O	Line out muting signal output
66	DIG/ANA	O	ON/OFF selection of the digital in PLL circuit "H": ON, "L": OFF
67	HELP (B)	O	The control signal to eliminate bugs in IC101 (CXD2531BR) is output
68	GFS	I	Guard frame sync input
69	SORS	O	Not used this set (Fixed at "H")
70	REC	O	Encoder/decoder mode selection to the shock proof memory controller (IC110) and EFM/ACIRC encoder/decoder (IC103) When encoder mode: "H"
71	SCTX	O	Writing data transmission timing output Used together with the magnetic field head ON/OFF output
72	LOCK	I	Spindle lock detection input When spindle lock: "H"
73	VCC	—	Power supply terminal (+5V)
74	VREF	I	Maximum output voltage input pin of the ⑫ pin APCREF
75	AVSS	—	Ground terminal (Analog)
76	CHACK. IN	I	Chucking in switch input When chucking: "L"
77	INIT	O	Initial reset output
78	XMODE	O	Reset output to IC210 (CXD8495Q) and IC260 (CXD8482Q)
79	ASY. DISEN	O	Asymmetry ON/OFF control Other than disc data input: "H" Not used this set (Fixed at "H")
80	LDON	O	Laser ON/OFF control output When the laser is ON: "H"

*1 Loading motor control

	IN	OUT	BRAKE
LOAD IN ㊳	"H"	"L"	"H"
LOAD OUT ㊴	"L"	"H"	"H"

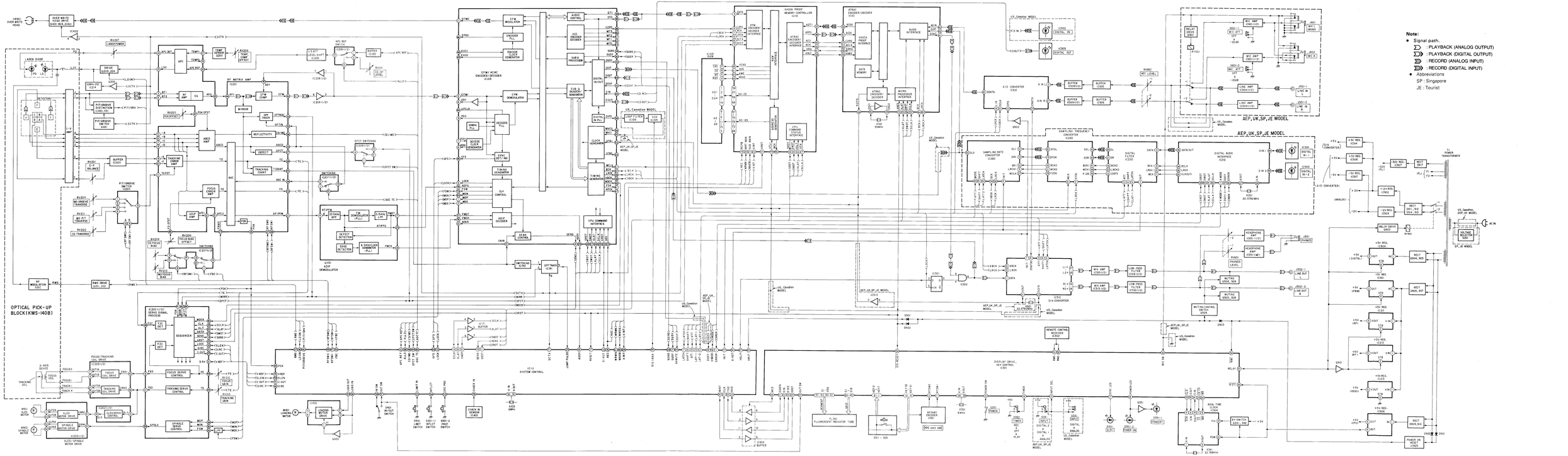
•IC260 SAMPLING RATE CONVERTER (CXD8482Q) (AEP, UK, Singapore, Tourist model only)

Pin Name	Signal Name	I/O	Function
1	TEST	I	Test input terminal "H": Test mode, "L": Normal mode (Fixed at "L")
2	N. C.	–	No connection
3	SYNC	I	Sync mode setting terminal "H": INT master mode, "L": EXT slave mode (Fixed at "L")
4	INIT	I	Initial reset input
5	N. C.	–	No connection
6	CFLG	O	FE calibration flag output Not used this set (open)
7, 8	VDD	–	Power supply terminal (+5V)
9	LRKI	I	L/R clock input from IC240 (CXD8457Q)
10	BKI	I	Beat clock input from IC240 (CXD8457Q)
11	N. C.	–	No connection
12	DLI	I	L-ch data input from IC240 (CXD8457Q)
13	DRI	I	R-ch data input from IC240 (CXD8457Q)
14	IFLG	O	FE sync flag output Not used this set (open)
15, 16	N. C.	–	No connection
17	FE	I	FE selection input Not used this set (Fixed at "L")
18	AL2	I	Data input Not used this set (Fixed at "L")
19	AR2	I	Data input Not used this set (Fixed at "L")
20	AL1	I	Data input Not used this set (Fixed at "L")
21	AR1	I	Data input Not used this set (Fixed at "L")
22, 23	VSS	–	Ground terminal
24, 25	CNVSS	–	Ground terminal
26	FCLK	O	128fs clock output for FE Not used this set (open)
27	MCLK	I	Master clock input from IC240 (CXD8457Q)
28	CVDD	–	Power supply terminal (+5V)
29	N. C.	–	No connection
30	IBIT	I	64fs in data mode selection input "H": 4bit, "L": 1 bit (Fixed at "L")
31	N. C.	–	No connection
32	VSS	–	Ground terminal
33	SCALE	I	Scale selection input "H": X4, "L": X5 (Fixed at "L")
34	ISEL1	I	FS selection for input data (Fixed at "H")
35	ISEL2	I	FS selection for input data (Fixed at "L")
36	N. C.	–	No connection
37	DITH	I	When dither active: "H", Stop: "L" (Fixed at "L")
38	BOOST	I	When boost active: "H", Normal: "L" (Fixed at "L")
39	VDD	–	Power supply terminal (+5V)
40	MODE	I	Serial data input from IC111 (system control)
41	SHIFT	I	Shift clock input from IC111 (system control)
42	LATCH	I	Latch clock input from IC111 (system control)
43	N. C.	–	No connection
44	LC	I	"H": Low frequency cut, "L": Flat (Fixed at "L")
45	SBM	I	When noise sharpping active: "H", Normal: "L" (Fixed at "L")
46	N. C.	–	No connection
47	OSEL	I	FS selection for data output When 2fs out or EX mode: "H", FS out: "L" (Fixed at "L")
48	OBIT	I	Bit selection for data output "H": 24 bit, "L": 16 bit (Fixed at "L")
49	DRO	O	Write clock output Not used this set (open)
50	DLO	O	L/R-ch data output
51	N. C.	–	No connection
52, 53	VSS	–	Ground terminal
54	BCK	I	Beat clock input from IC103 (CXD2525R)
55	N. C.	–	No connection
56	LRCK	I	L/R clock input from IC103 (CXD2525R)
57	OFLG	O	Outside sync flag output Not used this set (open)
58	VDD	–	Power supply terminal (+5V)
59	OVR	O	Overflow flag output of R-ch Not used this set (open)
60	OVL	O	Overflow flag output of L-ch Not used this set (open)

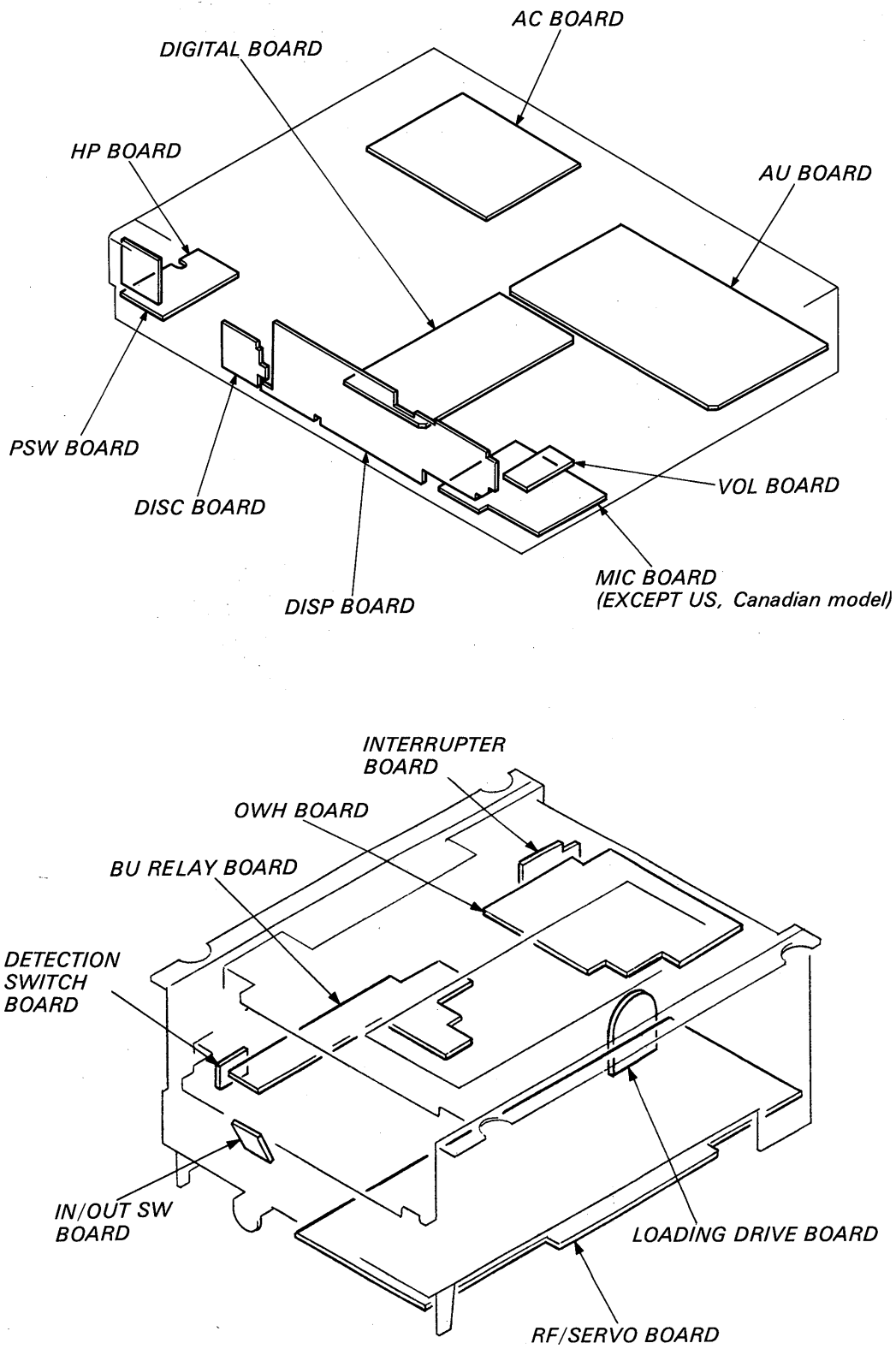
•IC301 MASTER MICROPROCESSOR (M38197MA-071FP)

Pin Name	Signal Name	I/O	Function
1—8	KEY7—KEY0	I	Key signal input
9, 10	KEYS1, KEYS0	O	Key scan signal output
11, 12	RTSW1, RTSW0	I	JOG dial pulse input from the rotary encoder (S301)
13	INPUT SEL	I	DIGITAL 1/2, ANALOG selection A/D input
14	TIMER	I	TIMER REC/OFF/PLAY selection A/D input
15	POWER SW	I	Power supply ON/OFF control input from the power switch (S351)
16	POWER LED	O	POWER ON and STANDBY LED (D351) drive output "H": STANDBY, "L": POWER ON
17	DISC LED	O	DISC LED (D301) drive output When inner disc: "H"
18	U/J	I	Model selection port (Fixed at "H")
19	TEST2	I	Not used this set (Fixed at "L")
20	SCK2	O	Communication clock output to IC111 (system control)
21	SDATA	O	Serial data output to IC111 (system control)
22	SIN	I	Serial data input from IC111 (system control)
23	$\overline{\text{CKCS}}$	O	Chip select output to IC304 (real time clock)
24	$\overline{\text{WR}}$	I	Write signal input from IC304 (real time clock)
25	SRST	I	Request for temporary interruption of communication with the system control (IC111)
26	MCS	O	Data transfer ON/OFF control output to IC111 (system control) "H": Data transfer ON
27	U/J-2	I	Model selection port US, Canadian models: Fixed at "L" AEP, UK, Singapore, Tourist models: Fixed at "H"
28	ALL REC	I	ALL REC selection input "L": ALL REC ON, "H": OFF (Fixed at "H")
29	OUT SW	I	Loading out switch input "L"at the position of load out Others: "H"
30	MIC SW	I	Mic in detection signal input When mic connection: "H"
31, 32	RMC	I	Remote control signal input from IC302 (remote control receiver)
33	ALL REC	I	ALL REC selection input "L": ALL REC ON, "H": OFF (Fixed at "H")
34	$\overline{\text{NMI}}$	I	Power ON reset input
35	$\overline{\text{RSTI}}$	I	Reset input
36	SYS RESET	O	System reset output
37	RELAY	O	Power relay (RY901) drive output "L": OFF, "H": ON
38	XIN	I	Clock input (8MHz)
39	XOUT	O	Clock output (8MHz)
40	VSS	—	Ground terminal
41	SIN	I	Data signal input from IC304 (real time clock)
42	SOUT	O	Data signal output to IC304 (real time clock)
43	$\overline{\text{CLK}}$	O	Clock transfer output to IC304 (real time clock)
44	TEST0	I	Not used this set (Fixed at "L")
45—60	G16—G1	O	Grid drive signal output to FL301 (fluorescent indicator tube)
61—90	S36—S7	O	Segment drive signal output to FL301 (fluorescent indicator tube)
91	VCC	—	Power supply terminal (+5V)
92—97	S6—S1	O	Segment drive signal output to FL301 (fluorescent indicator tube)
98	VEE	—	Power supply terminal (−32V)
99	AVSS	—	Ground terminal
100	VREF	I	Reference voltage input terminal

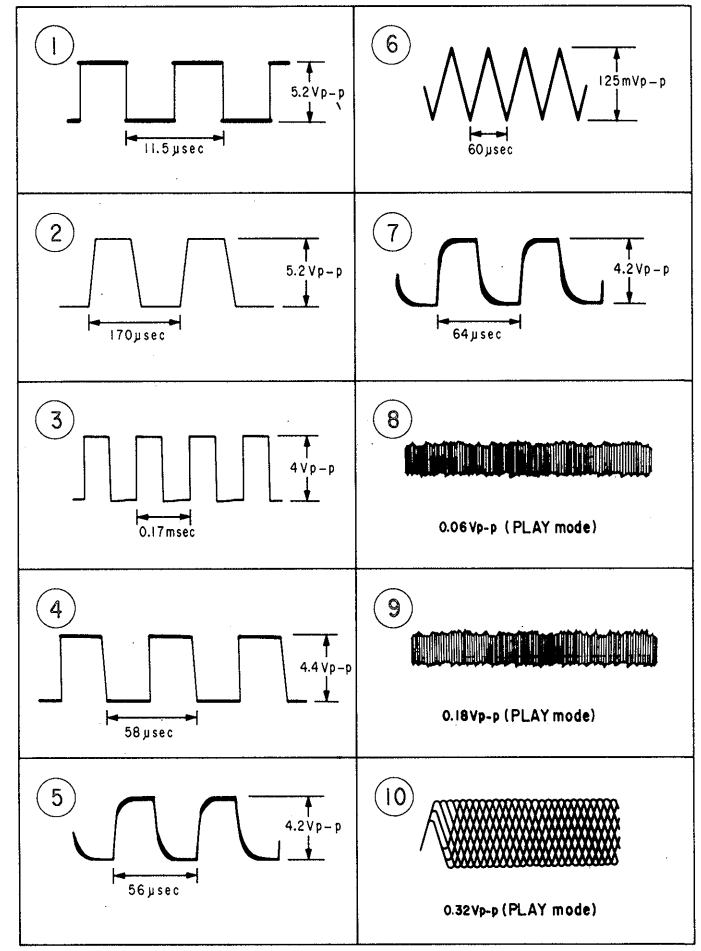
5-2. BLOCK DIAGRAM



5-3. CIRCUIT BOARDS LOCATION



● Waveforms —RF/SERVO Section—



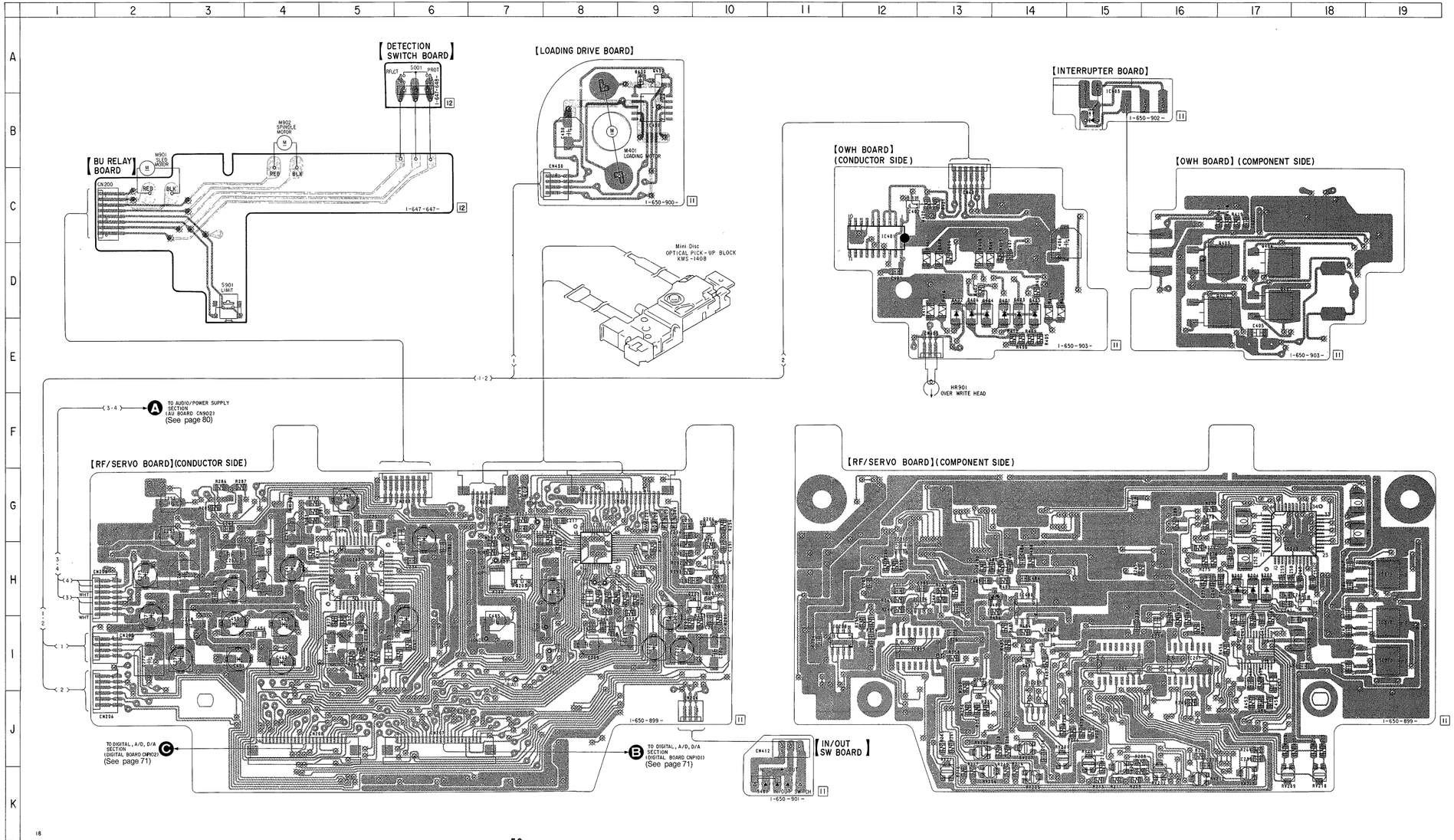
• Semiconductor Location

Ref. No.	Location
D201	G-7
D202	G-4
D203	H-17
D204	H-17
D205	H-17
D401	D-14
D402	D-13
D403	D-14
D404	D-13
D405	D-14
D406	D-13
D430	B-9
D480	H-13
IC201	G-8
IC202	H-5
IC203	G-18
IC204	I-15
IC205	J-14
IC206	H-12
IC207	I-16
IC208	I-11
IC209	I-12
IC210	H-18
IC211	H-19
IC212	H-19
IC213	I-19
IC214	G-10
IC215	G-12
IC401	C-12
IC402	C-12
IC403	D-15
IC430	B-9
IC450	I-17
IC480	I-14
IC481	I-14
Q201	H-10
Q202	H-10
Q203	H-7
Q204	G-7
Q205	I-13
Q206	G-10
Q401	D-16
Q402	D-17
Q403	D-16
Q404	D-17
Q430	B-9
Q481	I-14

Note on Printed Wiring Board:

- ○—— : parts extracted from the component side.
- ⊠ : Through hole.
- ▨ : Pattern on the side which is seen.
- ▨ : Pattern of the rear side.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.



Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- % : indicates tolerance.

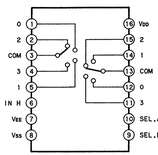
Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- ⊕ ——— : B+ Line
- ⊕ ▭ : adjustment for repair.
- ⊕ Voltage and waveforms are dc with respect to ground under no-signal conditions.

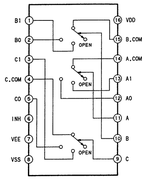
no mark : STOP/PLAYBACK/RECORD
( ) : RECORD
< > : PLAYBACK
※ : Impossible to measure the voltage at the marked points.

- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  - ▷ : PLAYBACK (ANALOG and DIGITAL OUTPUT)
  - ▷ : RECORD (ANALOG and DIGITAL INPUT)

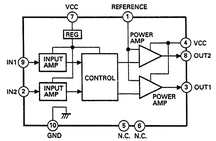
IC204 MC14052BF



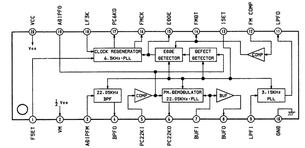
IC207, 209 HD14053BFP



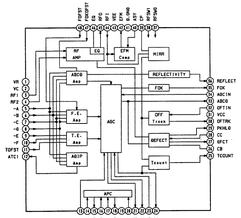
IC430 M54641FP



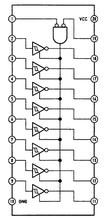
IC450 CXA1380N



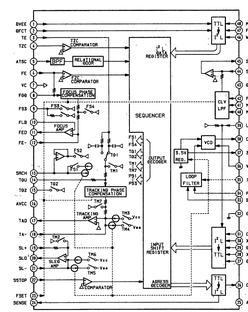
IC201 CXA1381R



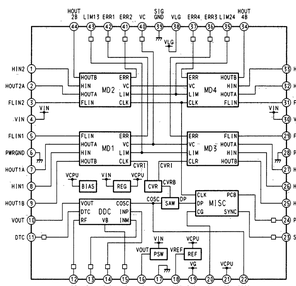
IC401 TC74ACT540F



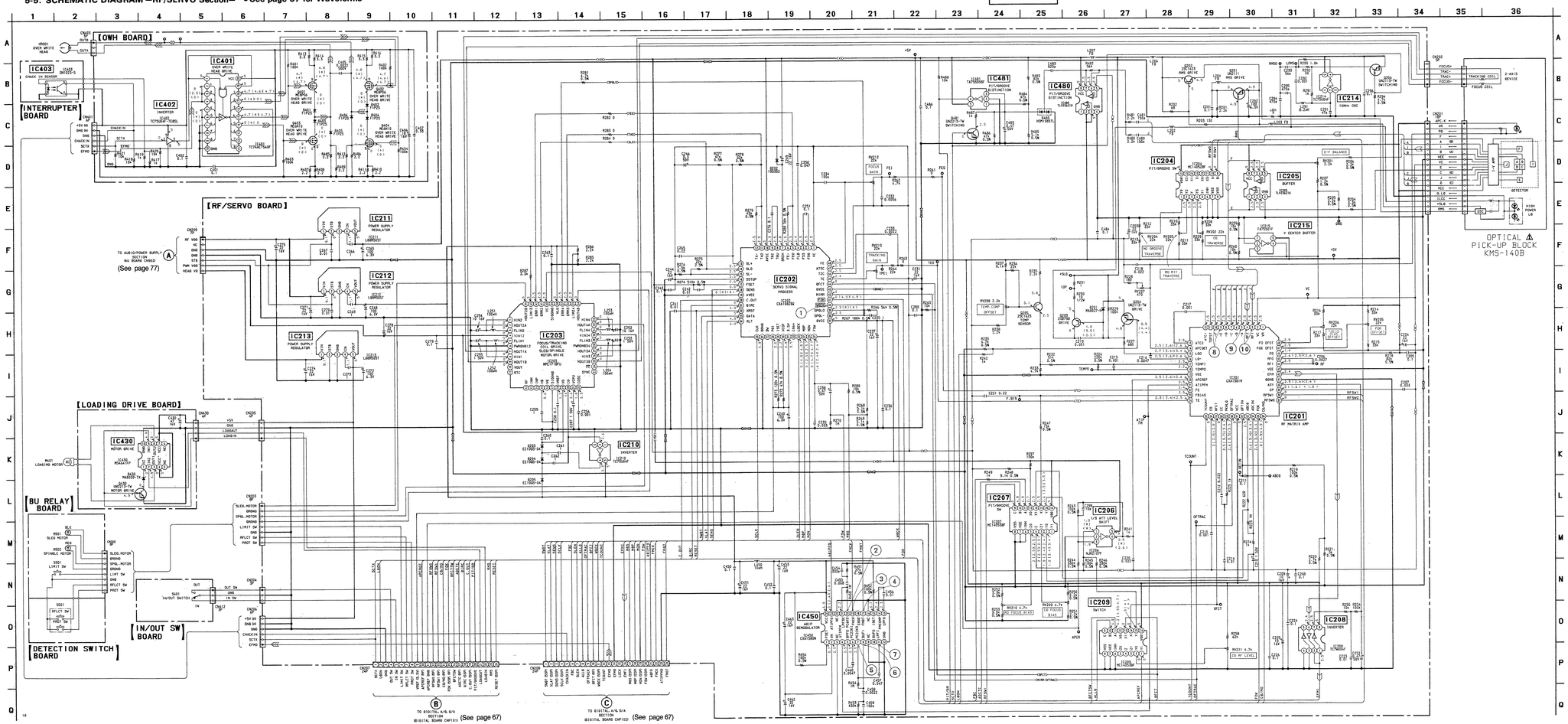
IC202 CXA1082BQ



IC203 MPC1718FU



5-5. SCHEMATIC DIAGRAM —RF/SERVO Section— ●See page 57 for Waveforms



5-6. SCHEMATIC DIAGRAM —DIGITAL, A/D, D/A Section—

See page 73,74 for IC Block Diagrams.

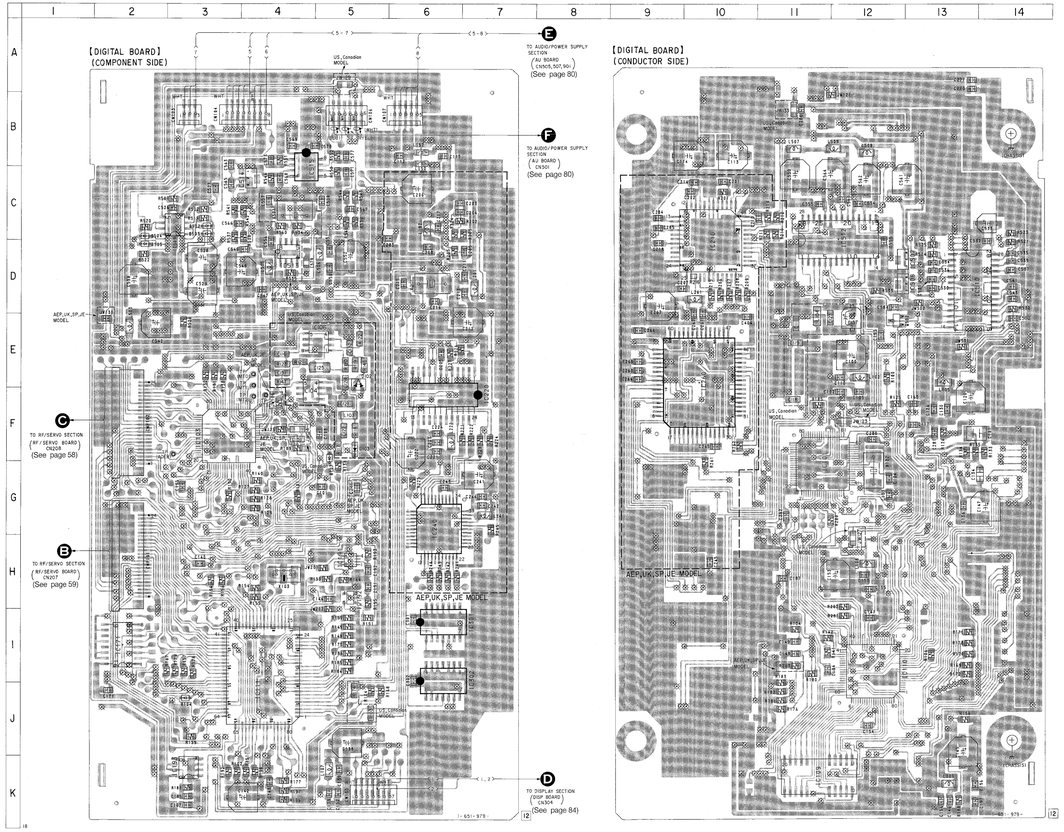
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- % : indicates tolerance.
- △ : internal component.
- ═══ : B+ Line
- ═══ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP/PLAYBACK/RECORD
  ( ) : RECORD
  < > : PLAYBACK
  ※ : Impossible to measure the voltage at the marked points.
- Voltages are taken with a VOM (Input Impedance 10M Ω). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ▷ : PLAYBACK (ANALOG OUTPUT)
  ▷▷ : PLAYBACK (DIGITAL OUTPUT)
  ▷▷ : RECORD (ANALOG INPUT)
  ▷▷▷ : RECORD (DIGITAL INPUT)
- Abbreviations
  SP : Singapore
  JE : Tourist

●Waveforms

① 4.4Vp-p, 58μsec	⑭ 4.4Vp-p, 6MHz	㉗ 5.2Vp-p, 90nsec, REC mode
② 4Vp-p, 0.17msec	⑮ 5.2Vp-p, 23μsec	㉘ 5.8Vp-p, 22.5792MHz, REC mode
③ 5.2Vp-p, 135μsec	⑯ 55MHz, ⑩ pin 2.9Vp-p, ⑪ pin 1.3Vp-p	㉙ 5.2Vp-p, 180nsec, REC mode
④ 5.2Vp-p, 135μsec	⑰ 4.6Vp-p, 22.5792MHz	㉚ 5.2Vp-p, 90nsec
⑤ 5.2Vp-p, 135μsec	⑱ 4.8Vp-p, 22.5792MHz	㉛ 5.2Vp-p, 0.36μsec
⑥ 5.2Vp-p, 135μsec	⑲ 100mVp-p, 19μsec	㉜ 5.2Vp-p, 11μsec
⑦ 3.1Vp-p, 22.5792MHz	⑳ 5.2Vp-p, 29μsec	㉝ 5.2Vp-p, 0.58μsec
⑧ 3.3Vp-p, 22.5792MHz	㉑ 5.2Vp-p, 23μsec, REC mode	㉞ 5.2Vp-p, 90nsec, REC mode
⑨ 5.2Vp-p, 0.34μsec	㉒ 5.2Vp-p, 0.36μsec, REC mode	㉟ 5.2Vp-p, 90nsec
⑩ 5.2Vp-p, 0.36μsec	㉓ 4.4Vp-p, 22.5792MHz, REC mode	㊱ 2.8Vp-p, 22.5792MHz
⑪ 5.2Vp-p, 0.58μsec	㉔ 4.6Vp-p, 22MHz, REC mode	㊲ 5.2Vp-p, 175nsec
⑫ 5.2Vp-p, 11.5μsec	㉕ 1.8Vp-p, 22MHz, REC mode	㊳ 4.6Vp-p, 90nsec
⑬ 4.2Vp-p, 6MHz	㉖ 5.2Vp-p, 2.9μsec, REC mode	㊴ 4.6Vp-p, 22.5792MHz

5-7. PRINTED WIRING BOARD –DIGITAL, A/D, D/A Section– ●See page 56 for Circuit Boards Location ●See page 88,89 for Semiconductor Lead Layouts



• Semiconductor Location

Ref. No.	Location
△ D102	E - 5
△ D103	F - 5
D104	J - 3
D107	F - 5
D502	C - 3
D503	C - 3
D504	C - 3
D505	D - 3
IC101	F - 11
IC103	F - 3
△ IC104	F - 4
△ IC106	E - 4
IC109	K - 11
IC110	I - 12
IC111	J - 4
IC171	I - 2
IC191	H - 5
IC192	H - 5
IC193	K - 3
○ IC210	D - 10
○ IC220	F - 6
○ IC240	G - 6
○ IC260	E - 10
IC301	I - 6
IC302	I - 6
IC507	D - 13
IC508	D - 13
IC509	C - 3
IC510	D - 13
IC512	C - 12
○ IC513	D - 4
IC514	C - 4
IC515	C - 4
Q502	E - 12

○ : AEP, UK, SP, JE MODEL ONLY
△ : US, Canadian MODEL ONLY

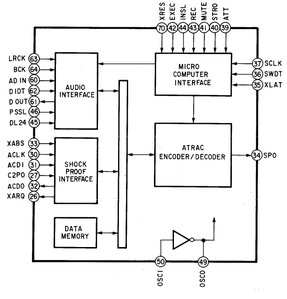
Note on Printed Wiring Board:
- ※ : Through hole.
- ▒ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

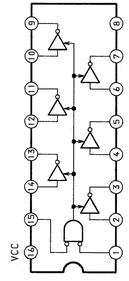
Caution:
Pattern face side: (Conductor Side) Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

- Abbreviations
  SP : Singapore
  JE : Tourist

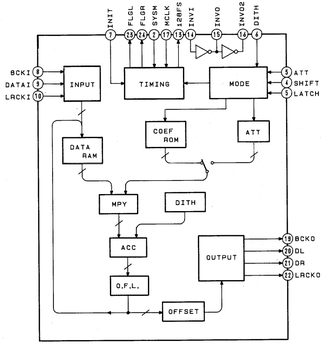
IC101 CXD2531R



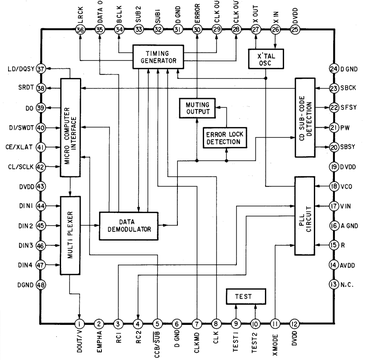
IC171 TC74HC365AF-TP1



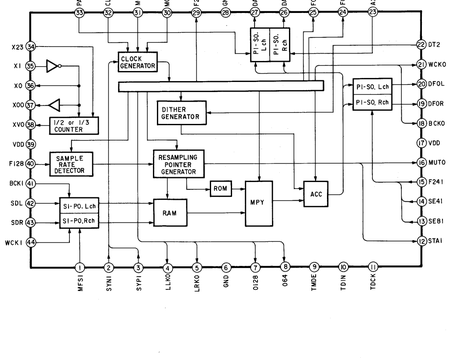
IC220 CXD2567M (AEP, UK, SP, JE MODEL ONLY)



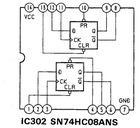
IC210 CXD8495Q (AEP, UK, SP, JE MODEL ONLY)



IC240 CXD8457Q (AEP, UK, SP, JE MODEL ONLY)

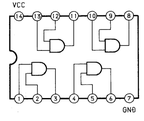


IC301 SN74HC74ANS

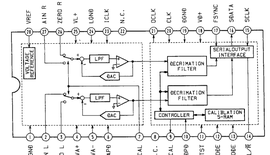


IC302 SN74HC08ANS

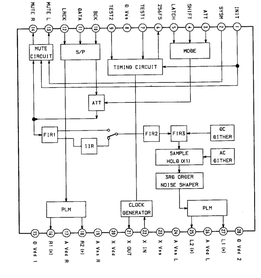
IC302 SN74HC08ANS



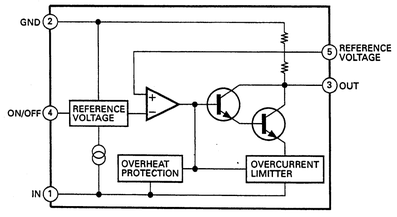
IC510 AK5369VS-T1



IC512 CXD2564AM



IC907 M5293L



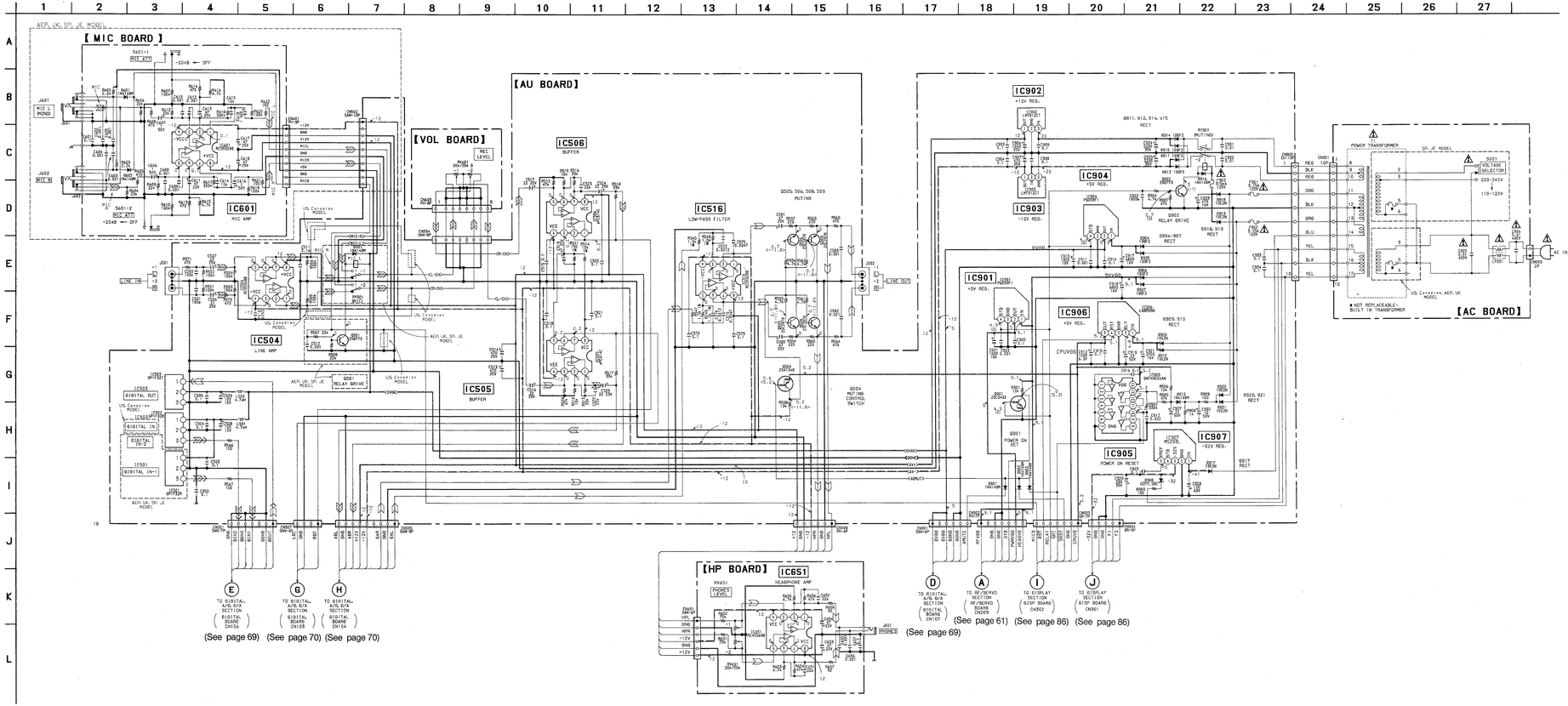
Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- % : indicates tolerance.

Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

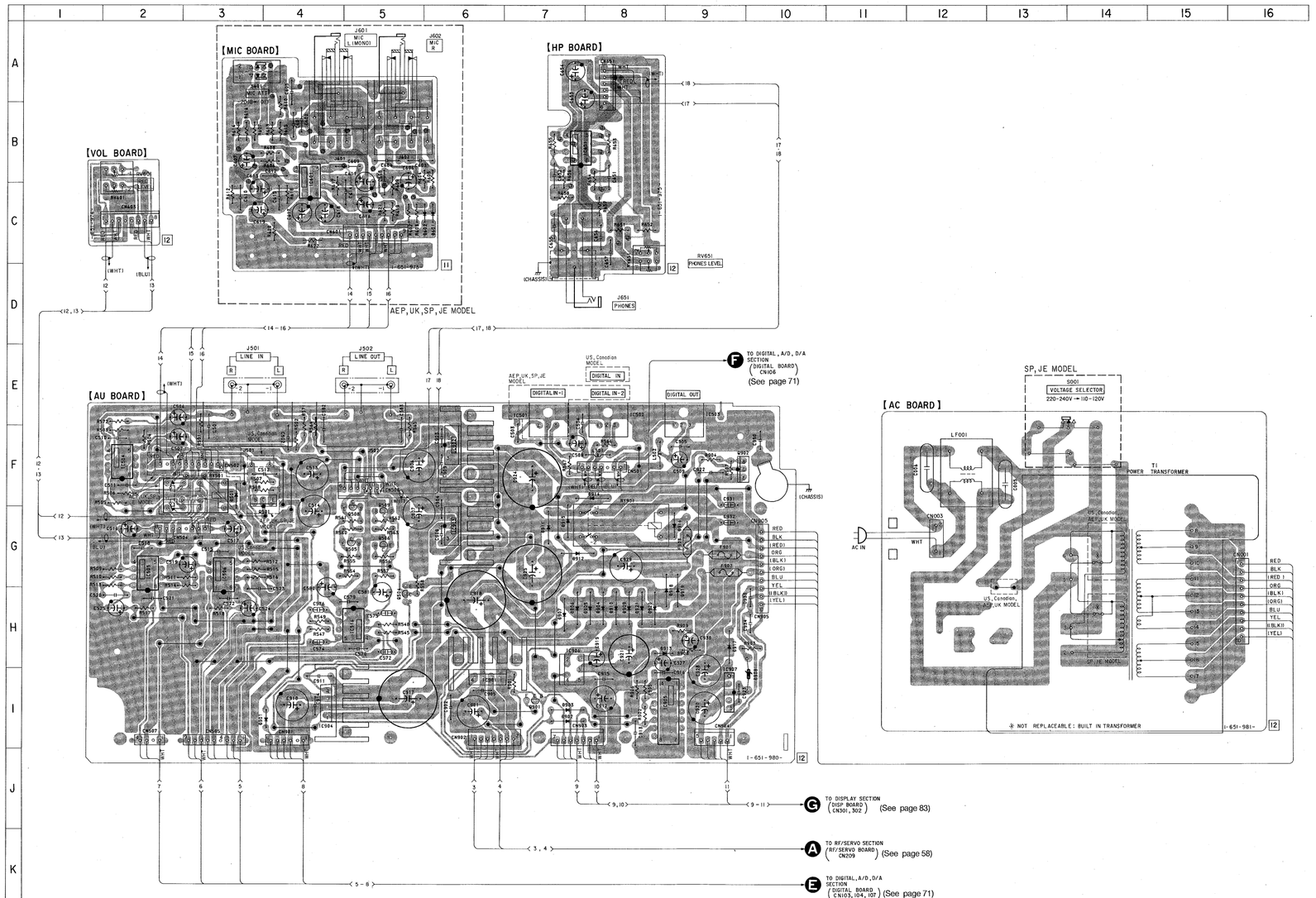
- ▭▭ : B+ Line
- ▭▭ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP/PLAYBACK/RECORD
  ( ) : PLAYBACK
  [ ] : STANDBY Condition
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Signal path.
  : PLAYBACK (ANALOG OUTPUT)
  : PLAYBACK (DIGITAL OUTPUT)
  : RECORD (ANALOG INPUT)
  : RECORD (DIGITAL INPUT)
- Abbreviations
  SP : Singapore
  JE : Tourist

5-8. SCHEMATIC DIAGRAM –AUDIO/POWER SUPPLY Section–



5-9. PRINTED WIRING BOARDS —AUDIO/POWER SUPPLY Section—

● See page 56 for Circuit Boards Location ● See page 88,89 for Semiconductor Lead Layouts



● Semiconductor Location

Ref. No.	Location
○ D501	F-3
○ D601	C-6
○ D602	C-6
D901	I-4
D902	I-7
D903	I-7
D904	H-8
D905	H-8
D906	H-7
D907	H-7
D908	I-10
D909	H-8
D910	H-8
D911	G-7
D912	G-7
D913	H-8
D914	F-8
D915	G-7
D916	G-9
D917	H-9
D918	H-9
D919	H-9
D920	H-8
D921	H-8
○ IC501	E-7
IC502	E-8
IC503	E-9
IC504	F-2
IC505	G-2
IC506	G-3
IC516	H-5
○ IC601	B-4
IC651	B-7
IC901	I-6
IC902	F-6
IC903	G-6
IC904	I-4
IC905	I-9
IC906	H-7
IC907	I-9
○ Q501	F-4
Q504	H-5
Q505	G-5
Q506	G-5
Q508	G-5
Q509	G-5
Q901	I-7
Q902	F-9

○ : AEP, UK, SP, JE MODEL ONLY

Note on Printed Wiring Board:

- ○—— : parts extracted from the component side.
- ⊕ : Through hole.
- ▒▒ : Pattern on the side which is seen.
- ▒▒ : Pattern of the rear side.
- Abbreviations
  SP : Singapore
  JE : Tourist

5-10. PRINTED WIRING BOARDS —DISPLAY Section—

● See page 56 for Circuit Boards Location ● See page 88,89 for Semiconductor Lead Layouts

• Semiconductor Location

Ref. No.	Location
D301	D - 1
D351	B - 1
IC301	D - 6
IC302	C - 9
IC303	D - 8
IC304	D - 4
Q331	C - 3
Q341	D - 3
Q342	E - 3

Note on Printed Wiring Board:

- ○—— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.
- ⊕ : Through hole.
- : Pattern on the side which is seen.
- : Pattern of the rear side.

Abbreviations
SP : Singapore
JE : Tourist

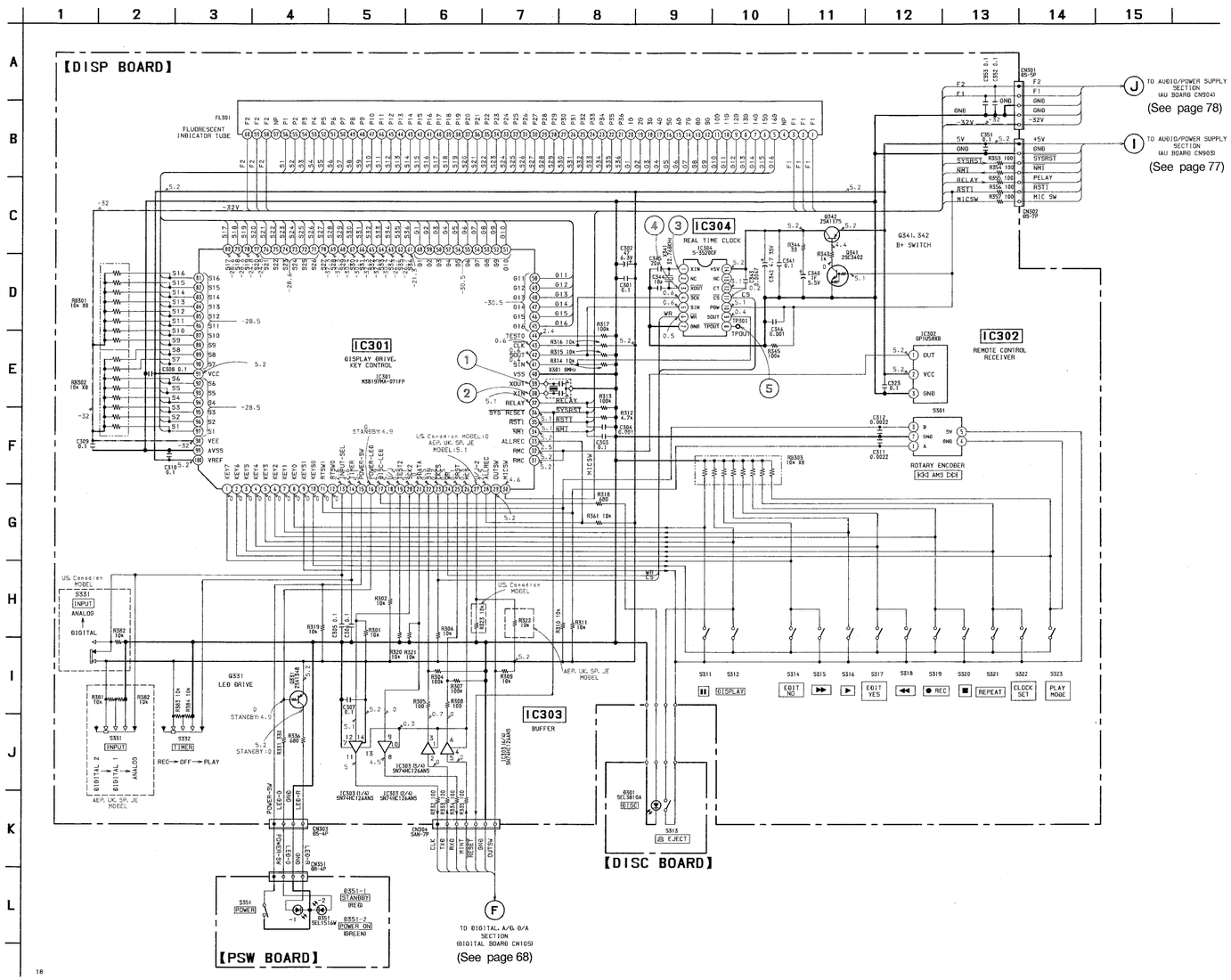
【PSW BOARD】

【DISP BOARD】

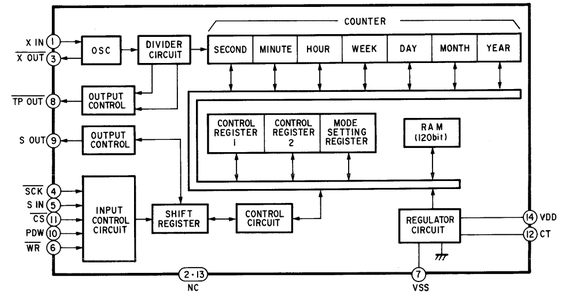
【DISC BOARD】

S351 POWER
CN351
D351
WHT
1-651-977-
D351-1 STANDBY (RED)
D351-2 POWER ON (GREEN)
S313 EJECT
D301 DISC
1-651-978-
S314
S311
S320
S319 REC
S312 DISPLAY
RB303
IC302
S331 INPUT
ANALOG ↔ DIGITAL
US, Canadian MODEL
AEP, UK, JE, SP MODEL
S332 TIMER
REC → OFF → PLAY
ANALOG ↔ DIGITAL 1 ↔ DIGITAL 2
S322 CLOCK SET
S321 REPEAT
S323 PLAY MODE
S314 EDIT NO
S317 EDIT YES
S301 AMS
CN304
1-651-976-
TH501
IC304
IC303
FL301 FLUORESCENT INDICATOR TUBE
RB301
RB302
AEP, UK, SP, JE MODEL
US, Canadian MODEL
9, 10
9 - 11
1, 2
G TO AUDIO/POWER SUPPLY SECTION (AU BOARD CN903, 904) (See page 80)
D TO DIGITAL, A/D, D/A SECTION (DIGITAL BOARD CN105) (See page 71)

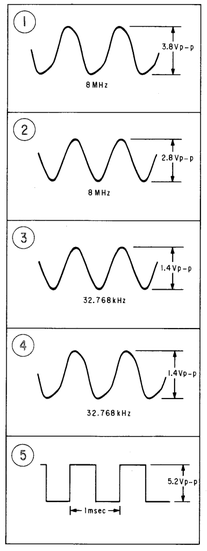
5-11. SCHEMATIC DIAGRAM —DISPLAY Section—



IC304 S-3520CF



● Waveforms

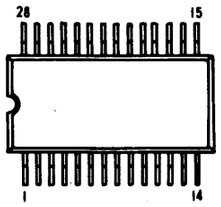


Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- △ : internal component.
- ▭ : B+ Line
- ▭ : B− Line
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : STOP/PLAYBACK/RECORD
- Voltages are taken with a VOM (input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Abbreviations
  SP : Singapore
  JE : Tourist

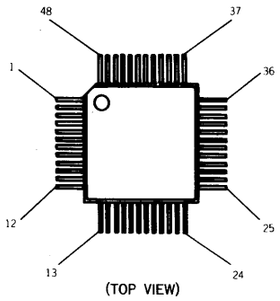
5-12. SEMICONDUCTOR LEAD LAYOUTS

AK5369VS-T1
CXD2564AM



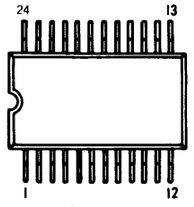
(TOP VIEW)

CXA1082BQ
CXA1381R
CXD8495Q



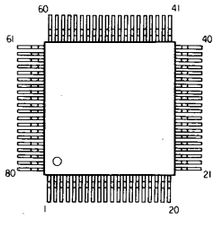
(TOP VIEW)

CXA1380N
CXD2567M

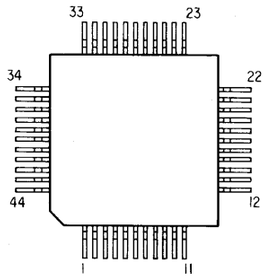


(TOP VIEW)

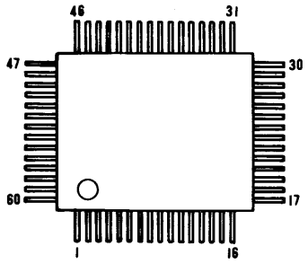
CXD2525R
CXD2526AR
CXD2531BR



CXD8457Q
MPC1718FU

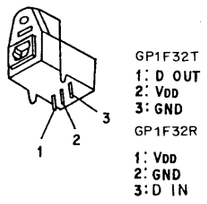


CXD8482Q



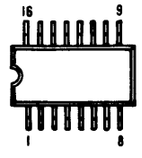
MARKING SIDE VIEW

GP1F32R
GP1F32T



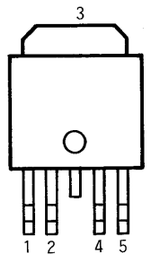
GP1F32T
1: D OUT
2: VDD
3: GND
GP1F32R
1: VDD
2: GND
3: D IN

HD14053BFP
MC14052BF
TC74HC365AF-TP1

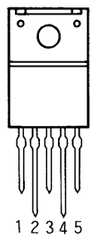


(TOP VIEW)

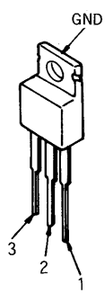
L88MS05T-FA-TL



L88R05D

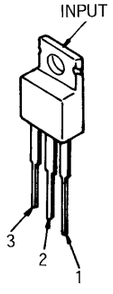


LM7812CT



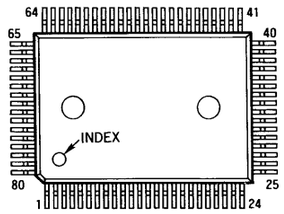
1. OUTPUT
2. GND
3. INPUT

LM7912CT



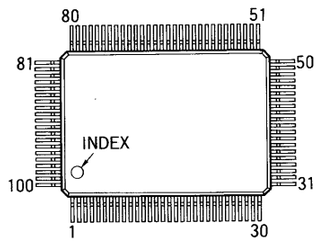
1. OUTPUT
2. INPUT
3. GND

M38067MC-070FP



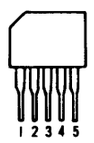
(TOP VIEW)

M38197MA-071FP

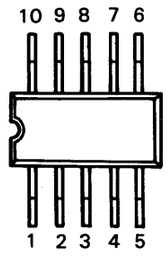


(TOP VIEW)

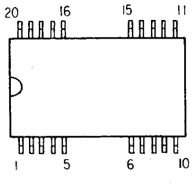
M5293L



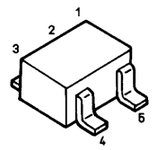
M54641FP



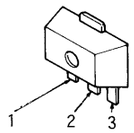
MSM514400A70SJADR1-K



NJM2107F
TA75S393F
TC4S30F
TC7SU04F

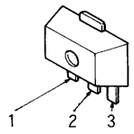


NJM78L05UA



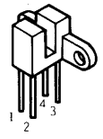
1. OUTPUT
2. GND
3. INPUT

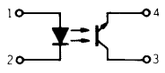
NJM79L05UA



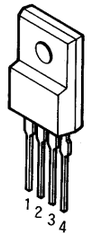
1. GND
2. INPUT
3. OUTPUT

ON1023-S



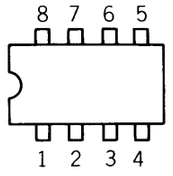


PQ05RF1



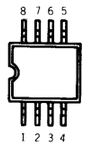
1 : V IN 3 : GND
2 : V OUT 4 : ON/OFF CONTROL

RC4556D
RC5532DD
μPC814C



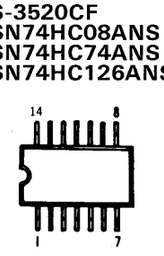
(Top view)

RC5532M
TC7W74FU
TC7WU04F
TLV2362ID-ELL2500
μPC814G2-1
μPD358GR-E1



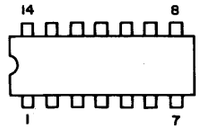
(TOP VIEW)

S-3520CF
SN74HC08ANS
SN74HC74ANS
SN74HC126ANS



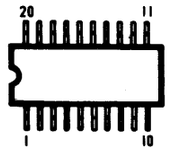
(TOP VIEW)

SN74HC04AN



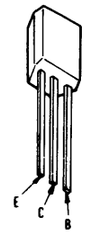
(TOP VIEW)

TC74ACT540F

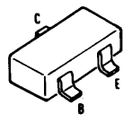


(TOP VIEW)

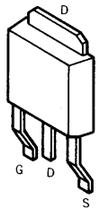
DTA114ES
DTC114ES



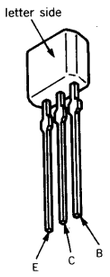
DTA144EK
UN2111
UN2213
2SC1623-L5L6



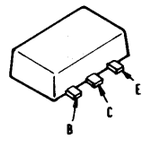
ME6N10-TE16F3
ME8P06-TE16F3



2SA1175-HFE

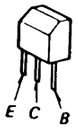


2SB798-DL

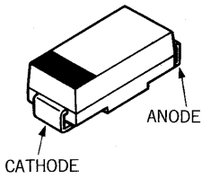


2SC2878-AB

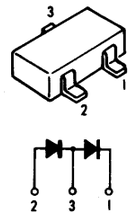
2SD773-34



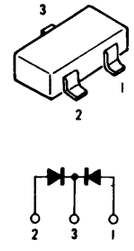
EC10QS-04
F1P2STP



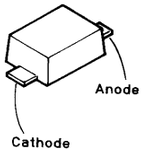
HSM198STL



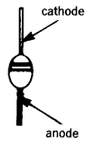
HVM17-01



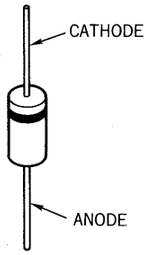
MA8027-L
MA8033



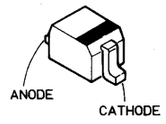
U05G



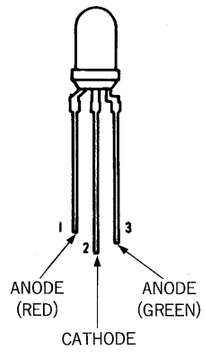
UZP-7.5BC
1N4148M
10E2N



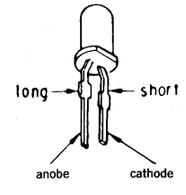
1SS352



SEL1516W



SEL3810A-CD



SECTION 6
EXPLODED VIEWS

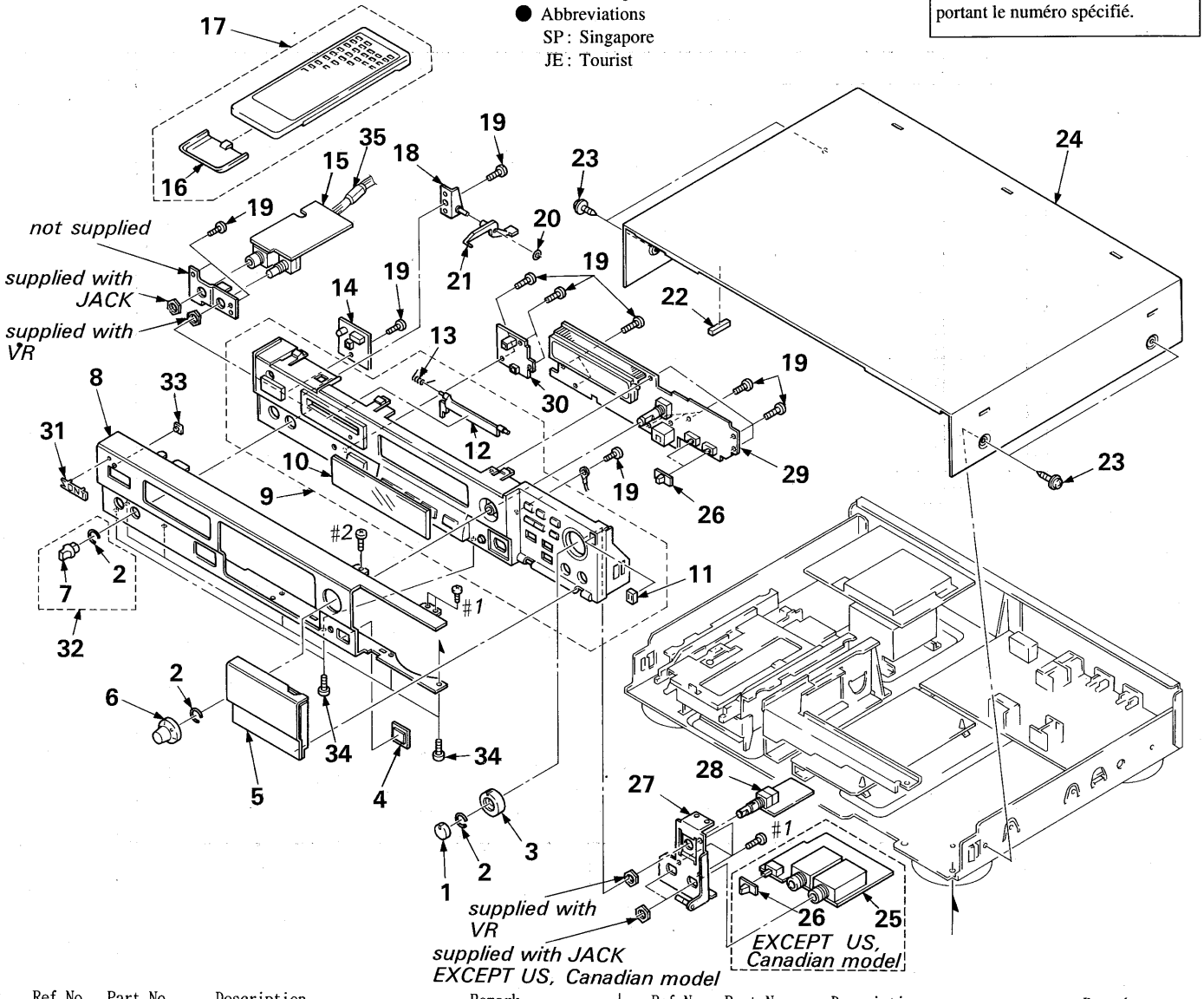
NOTE:

- -xx,-x mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (#mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviations
  SP: Singapore
  JE: Tourist

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les components identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

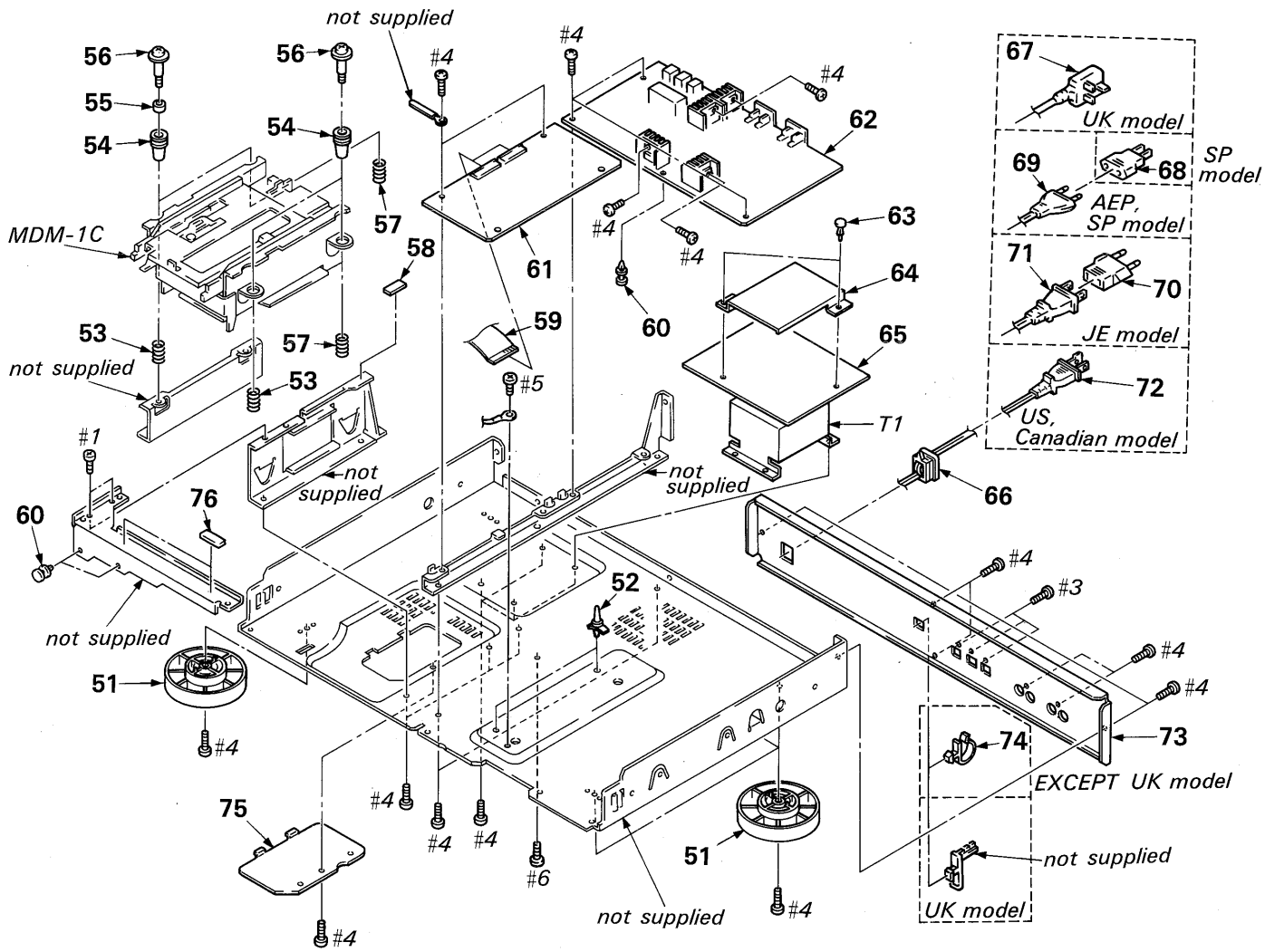
6-1. CABINET SECTION



Ref.No.	Part No.	Description	Remark
1	4-963-359-01	KNOB (REC-A)	
2	3-354-981-01	SPRING (SUS), RING	
3	4-963-360-01	KNOB (REC-B)	
4	4-963-338-01	WINDOW (REMOTE CONTROL)	
5	X-4944-343-1	LID ASSY (AEP,UK,SP,JE)	
5	X-4944-354-1	LID ASSY (US,Canadian)	
6	4-962-176-01	KNOB (AMS)	
7	3-354-931-01	KNOB (DIA.10)	
8	4-963-331-01	PANEL, FRONT	
9	X-4944-341-1	BASE ASSY, PANEL (AEP,UK,SP,JE)	
9	X-4944-353-1	PANEL BASE ASSY (US,Canadian)	
10	4-963-335-01	WINDOW (DISPLAY)	
*11	3-736-779-01	MAGNET	
12	4-956-123-01	LID	
13	4-956-130-01	SPRING (LID), TORSION	
*14	1-651-977-11	PSW BOARD	
*15	1-651-975-11	HP BOARD	
16	3-707-584-21	COVER, BATTERY (RM-D1M)	
17	1-466-914-11	COMMANDER, STANDARD (RM-D1M)	

Ref.No.	Part No.	Description	Remark
18	X-4944-344-1	BRACKET (LEVER LID) ASSY	
19	4-951-620-01	SCREW (2.6X8), +BVTP	
20	3-558-708-01	WASHER, STOPPER	
21	4-962-159-01	LEVER (LID)	
22	9-911-842-XX	CUSHION (S)	
23	3-704-366-01	SCREW (CASE) (M3X8)	
24	4-963-350-01	CASE	
*25	A-4649-973-A	MIC BOARD, COMPLETE (AEP,UK,SP,JE)	
26	4-963-352-01	KNOB, SLIDE	
27	X-4944-342-1	SHAFT (FULCRUM) ASSY	
*28	1-651-974-11	VOL BOARD	
*29	A-4649-981-A	DISP BOARD, COMPLETE (US,Canadian)	
*29	A-4673-113-A	DISP BOARD, COMPLETE (AEP,UK,SP,JE)	
*30	1-651-978-11	DISC BOARD	
31	4-942-568-01	EMBLEM (NO.5), SONY	
32	A-2003-693-A	KNOB (DIA. 10) ASSY	
33	4-884-612-11	INDICATOR, EJECT	
34	3-703-685-21	SCREW (+BV 3X8)	
35	1-543-844-11	BEAD, FERRITE (US,Canadian)	

6-2. CHASSIS SECTION

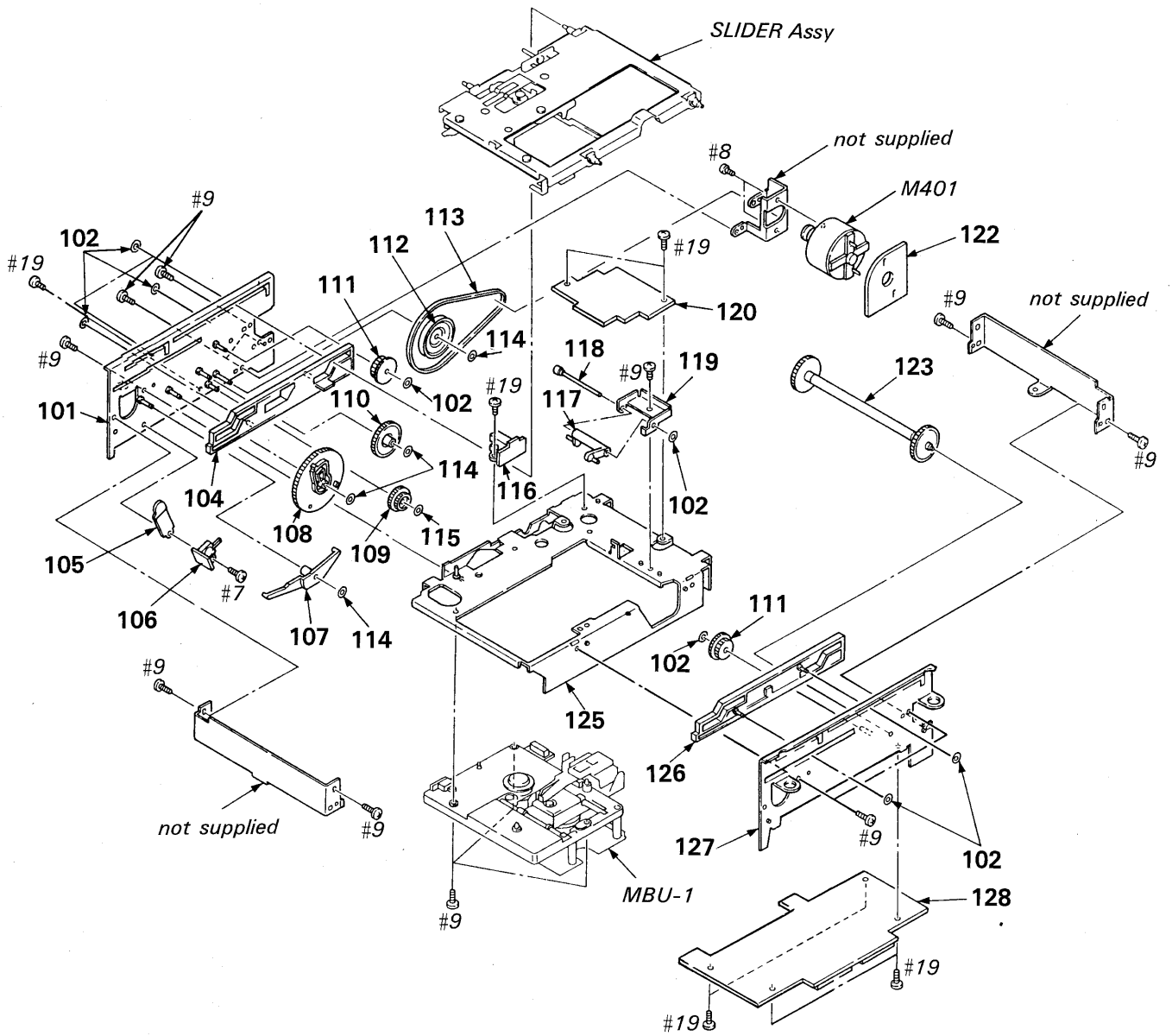


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les components identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description	Remark
51	4-956-885-01	FOOT (F58175S2W) (US,Canadian)	
51	4-956-885-11	FOOT (F58175S2W) (AEP,UK,SP,JE)	
*52	3-703-353-02	SUPPORT, PC BOARD	
*53	4-958-087-01	SPRING (FRONT), COMPRESSION	
54	4-957-800-01	DAMPER (MD)	
55	4-958-120-01	BUSHING (DAMPER)	
56	4-964-232-01	SCREW (M3), STEP	
*57	4-958-088-01	SPRING (REAR), COMPRESSION	
58	9-911-840-XX	CUSHION, CRT	
59	1-751-829-11	WIRE (FLAT TYPE) (24 CORE)	
*60	4-958-674-01	SPACER, MINIATURE CARD	
*61	A-4649-982-A	DIGITAL BOARD, COMPLETE (US,Canadian)	
*61	A-4673-139-A	DIGITAL BOARD, COMPLETE (AEP,UK,SP,JE)	
*62	A-4649-971-A	AU BOARD, COMPLETE (AEP,UK,SP,JE)	
*62	A-4673-085-A	AU BOARD, COMPLETE (US,Canadian)	
63	4-812-134-11	RIVET NYLON, 3.5	
*64	4-963-601-01	COVER (POWER)	
*65	1-651-981-11	AC BOARD	

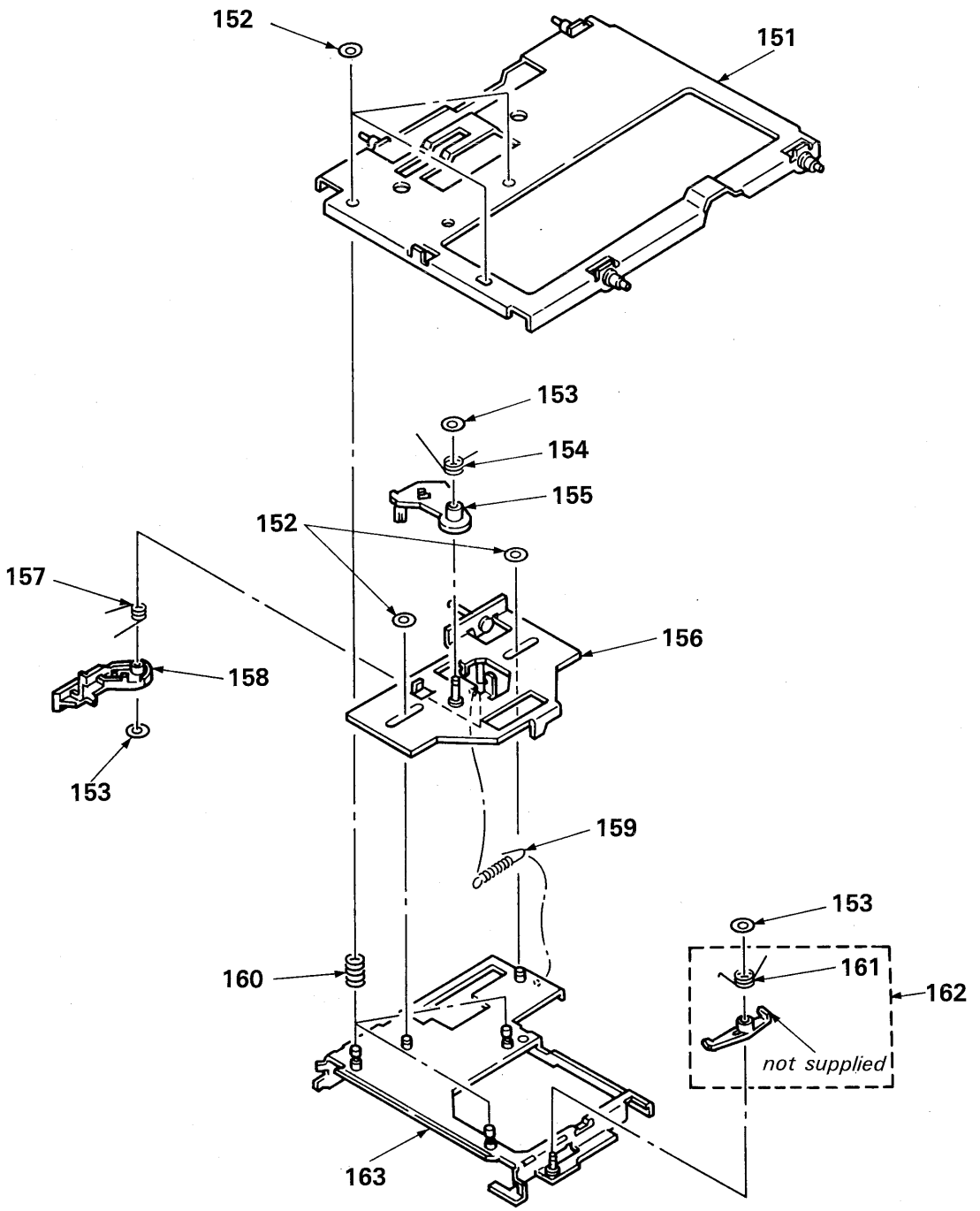
Ref.No.	Part No.	Description	Remark
*66	3-703-244-00	BUSHING (2104), CORD	
⚠67	1-696-586-11	CORD, POWER (UK)	
⚠68	1-569-008-11	ADAPTER, CONVERSION 2P (SP)	
⚠69	1-558-568-21	CORD, POWER (AEP,SP)	
⚠70	1-569-007-11	ADAPTER, CONVERSION 2P (JE)	
⚠71	1-558-181-21	CORD, POWER (JE)	
⚠72	1-559-583-21	CORD, POWER (US,Canadian)	
*73	4-963-349-11	PANEL, BACK (US)	
*73	4-963-349-21	PANEL, BACK (Canadian)	
*73	4-963-349-31	PANEL, BACK (SP,JE)	
*73	4-963-349-41	PANEL, BACK (UK)	
*73	4-963-349-51	PANEL, BACK (AEP)	
*74	4-949-235-01	HOOK (EXCEPT UK)	
*75	4-956-877-01	LID (CHASSIS)	
76	9-911-840-XX	CUSHION,TRANSFORMER	
⚠T1	1-426-677-11	TRANSFORMER, POWER (US,Canadian)	
⚠T1	1-426-720-11	TRANSFORMER, POWER (SP,JE)	
⚠T1	1-426-721-11	TRANSFORMER, POWER (AEP,UK)	

6-3. MECHANISM DECK SECTION-1 (MDM-1C)



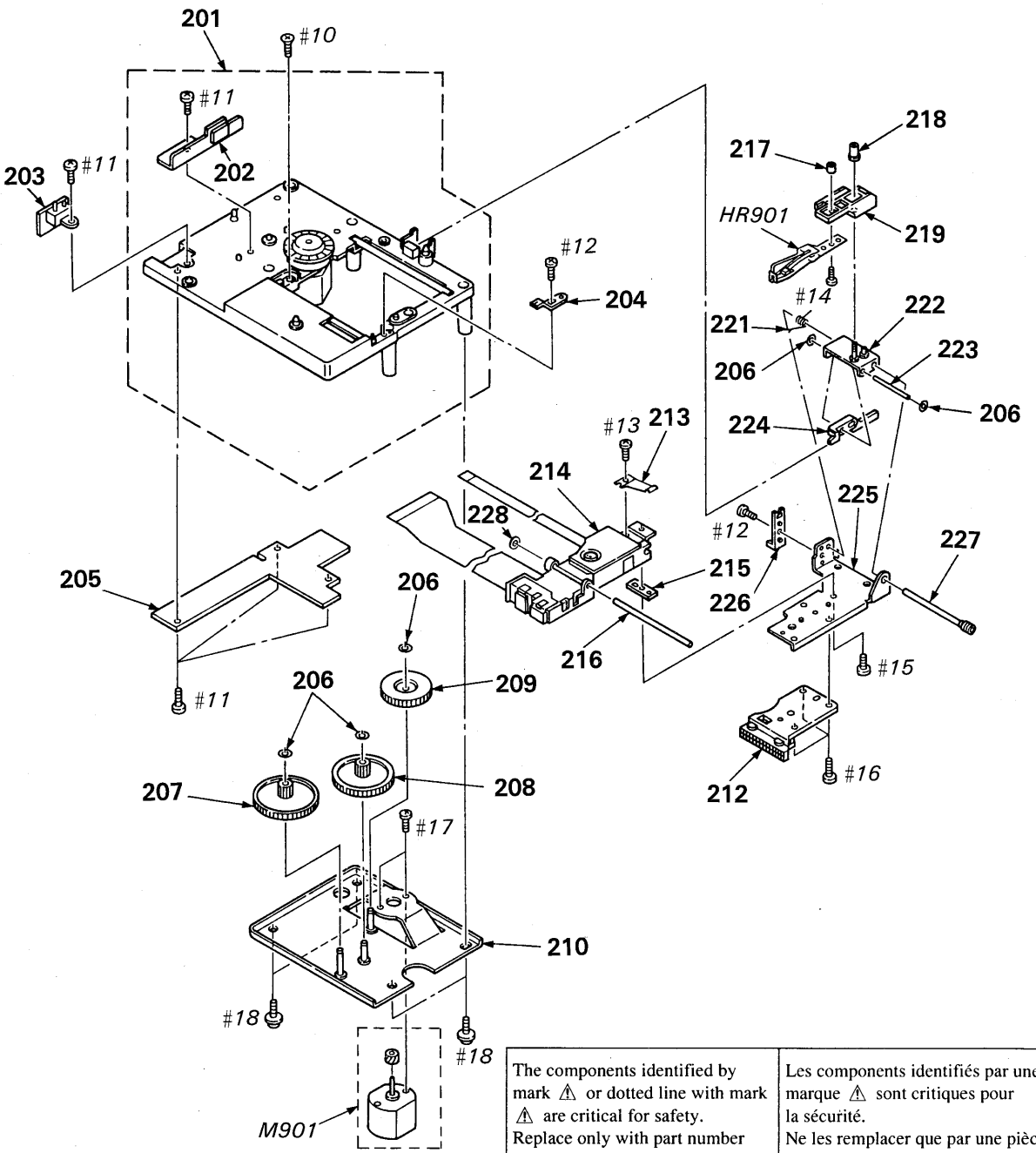
Ref.No.	Part No.	Description	Remark
*101	X-4943-546-1	BRACKET (GUIDE L) ASSY	
102	4-957-798-01	WASHER, STOPPER	
104	X-4943-553-1	RACK (PLATE CAM L) ASSY	
*105	4-957-799-01	BLOCK (SW)	
*106	1-650-901-11	IN/OUT SW BOARD	
107	4-962-171-01	LEVER (O/C)	
108	4-957-801-01	GEAR (CAM GEAR)	
109	4-957-805-01	GEAR (S)	
110	4-957-804-01	GEAR (2)	
111	4-957-795-01	GEAR (DRIVING)	
112	4-957-794-01	PULLEY (GEAR 1)	
113	4-957-797-01	BELT (LOADING)	
114	3-558-708-21	WASHER, STOPPER	
115	3-558-708-01	WASHER, STOPPER	
*116	1-650-902-11	INTERRUPTER BOARD	
117	4-957-816-01	LEVER (REC LEVER)	
118	4-957-815-01	SHAFT (REC LEVER)	
*119	4-957-814-01	BRACKET (REC LEVER)	
*120	A-4649-921-A	OWH BOARD, COMPLETE	
*122	1-650-900-11	LOADING DRIVE BOARD	
123	A-4660-372-A	SHAFT (JOINT) ASSY	
*125	X-4943-552-1	BRACKET (BU) ASSY	
126	X-4943-551-1	RACK (PLATE CAM R) ASSY	
*127	X-4943-547-1	BRACKET (GUIDE R) ASSY	
*128	A-4649-918-A	RF/SERVO BOARD, COMPLETE	
M401	A-4660-373-A	MOTOR ASSY (LOADING)	

6-4. MECHANISM DECK SECTION-2 (SLIDER ASSY) (MDM-1C)



Ref.No.	Part No.	Description	Remark
*151	X-4943-549-1	SLIDER ASSY	
152	3-558-708-21	WASHER, STOPPER	
153	4-957-798-01	WASHER, STOPPER	
154	4-957-810-01	SPRING, TORSION	
155	4-957-802-01	LEVER (DETECTION)	
*156	X-4943-550-1	SLIDER (EJECT) ASSY	
157	4-957-809-01	SPRING (EJECT LEVER), TORSION	
158	4-957-803-01	LEVER (EJECT)	
159	4-957-811-01	SPRING (EJ SLIDER), TORSION	
160	4-957-808-01	SPRING, COMPRESSION	
161	4-957-812-01	SPRING (SHUTTER LEVER),TORSION	
162	X-4944-745-1	REPAIR KIT	
*163	X-4943-548-1	HOLDER ASSY	

6-5. BASE UNIT SECTION (MBU-1)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les components identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description	Remark
201	A-4660-222-A	CHASSIS (BU) COMPLETE ASSY	
202	A-4660-364-A	BRACKET (MAGNET) ASSY	
*203	1-647-648-11	DETECTION SWITCH BOARD	
204	4-957-047-01	HOLDER (SHAFT)	
*205	1-647-647-11	BU RELAY BOARD	
206	3-681-678-00	WASHER, SLIT	
207	4-957-057-01	GEAR (PINION A)	
208	4-957-058-01	GEAR (PINION B)	
209	4-957-059-01	GEAR (PINION C)	
*210	X-4943-431-1	BRACKET (PINION) ASSY	
212	X-4943-432-1	RACK ASSY	
213	4-957-056-01	DETENT (OPTICS BLOCK)	
⚠214	8-583-003-21	DEVICE, MINI DISK KMS-140B	
215	4-957-048-01	SPACER	

Ref.No.	Part No.	Description	Remark
216	4-957-044-01	SHAFT (SLED A)	
217	4-957-053-01	NUT (M1.7), FITTING	
218	4-957-658-01	NUT (M2), FASTENING	
*219	4-957-054-01	HOLDER (OWH)	
221	4-957-049-01	SPRING (HOLDER), TORSION	
*222	X-4943-433-1	BRACKET (HOLDER) ASSY	
223	4-957-051-01	SHAFT (SLED D)	
*224	4-957-061-01	LEVER (OWH)	
*225	4-957-052-01	BRACKET (RACK)	
*226	4-957-055-01	HOLDER (WIRE)	
227	X-4943-434-1	SCREW ASSY, ADJUSTMENT	
228	4-958-741-01	SPACER	
HR901	1-500-006-11	HEAD, OVER LIGHT	
M901	X-4944-046-1	MOTOR ASSY (SLED)	

SECTION 7
ELECTRICAL PARTS LIST

AC **AU**

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ, for example:
  uA··· : μA···, uPA··· : μPA···, uPB··· : μPB···, uPC··· : μPC···, uPD··· : μPD···
- CAPACITORS
  uF : μF
- COILS
  uH : μH
- Abbreviations
  SP: Singapore JE: Tourist

When indicating parts by reference number, please include the board.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les components identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description			Remark
*	1-651-981-11	AC BOARD			
		********			
		< CAPACITOR >			
⚠C005	1-161-744-51	CERAMIC	0.01uF	400V	
⚠C006	1-161-744-51	CERAMIC	0.01uF	400V	
		< CONNECTOR >			
*CN003	1-580-230-31	PIN, CONNECTOR (PC BOARD) 2P			
		< LINE FILTER >			
⚠LF001	1-424-485-11	FILTER, LINE			
		< SWITCH >			
⚠S001	1-572-675-11	SWITCH, POWER VOLTAGE CHANGE (VOLTAGE SELECTOR) (SP,JE)			
**********					
*	A-4649-971-A	AU BOARD, COMPLETE (AEP,UK,SP,JE)			
*	A-4673-085-A	AU BOARD, COMPLETE (US,Canadian)			
		**********			
*	4-363-146-00	HEAT SINK, V.OUT			
*	4-870-539-00	PLATE, GROUND			
		< CAPACITOR >			
C501	1-162-282-31	CERAMIC	100PF	10% 50V	
C502	1-162-282-31	CERAMIC	100PF	10% 50V	
C503	1-164-159-11	CERAMIC	0.1uF	50V	
C504	1-164-159-11	CERAMIC	0.1uF	50V	
C505	1-164-159-11	CERAMIC	0.1uF	50V	
C506	1-126-233-11	ELECT	22uF	20% 50V	
C507	1-126-233-11	ELECT	22uF	20% 50V	
C508	1-124-443-00	ELECT	100uF	20% 10V	
C509	1-124-443-00	ELECT	100uF	20% 10V	
C510	1-164-159-11	CERAMIC	0.1uF	50V	
C511	1-164-159-11	CERAMIC	0.1uF	50V	
C512	1-162-294-31	CERAMIC	0.001uF	10% 50V (AEP,UK,SP,JE)	
C513	1-124-480-11	ELECT	470uF	20% 25V	
C514	1-124-480-11	ELECT	470uF	20% 25V	
C515	1-164-159-11	CERAMIC	0.1uF	50V	
C516	1-126-233-11	ELECT	22uF	20% 50V	
C517	1-126-233-11	ELECT	22uF	20% 50V	
C518	1-164-159-11	CERAMIC	0.1uF	50V	
C519	1-124-477-11	ELECT	47uF	20% 25V	
C520	1-162-207-31	CERAMIC	22PF	5% 50V	
C521	1-164-159-11	CERAMIC	0.1uF	50V	
C522	1-164-159-11	CERAMIC	0.1uF	50V	
C523	1-162-207-31	CERAMIC	22PF	5% 50V	
C524	1-126-233-11	ELECT	22uF	20% 50V	
C525	1-126-233-11	ELECT	22uF	20% 50V	
C570	1-164-159-11	CERAMIC	0.1uF	50V	
C572	1-130-472-00	MYLAR	0.0012uF	5% 50V	
C574	1-130-472-00	MYLAR	0.0012uF	5% 50V	
C575	1-106-359-00	MYLAR	4700PF	5% 200V	
C576	1-106-359-00	MYLAR	4700PF	5% 200V	
C579	1-164-159-11	CERAMIC	0.1uF	50V	
C580	1-124-910-11	ELECT	47uF	20% 50V	
C581	1-124-910-11	ELECT	47uF	20% 50V	
C582	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C583	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C901	1-124-473-11	ELECT	1000uF	20% 10V	
C902	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C903	1-164-159-11	CERAMIC	0.1uF	50V	
C904	1-164-159-11	CERAMIC	0.1uF	50V	
C905	1-164-159-11	CERAMIC	0.1uF	50V	
C906	1-124-557-11	ELECT	1000uF	20% 25V	
C907	1-124-480-11	ELECT	470uF	20% 25V	
C908	1-164-159-11	CERAMIC	0.1uF	50V	
C909	1-164-159-11	CERAMIC	0.1uF	50V	
C910	1-124-473-11	ELECT	1000uF	20% 10V	
C911	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C912	1-126-916-11	ELECT	1000uF	20% 6.3V	
C913	1-161-494-00	CERAMIC	0.022uF	25V	
C914	1-164-159-11	CERAMIC	0.1uF	50V	
C915	1-164-159-11	CERAMIC	0.1uF	50V	
C916	1-164-159-11	CERAMIC	0.1uF	50V	
C917	1-126-946-11	ELECT	6800uF	20% 16V	

AU

Ref.No.	Part No.	Description			Remark
C918	1-126-946-11	ELECT	6800uF	20% 16V	
C919	1-124-916-11	ELECT	22uF	20% 63V	
C920	1-124-485-11	ELECT	330uF	20% 35V	
C921	1-126-768-11	ELECT	2200uF	20% 16V	
C922	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C923	1-164-159-11	CERAMIC	0.1uF	50V	
C924	1-126-953-11	ELECT	2200uF	20% 35V	
C925	1-126-953-11	ELECT	2200uF	20% 35V	
C927	1-124-916-11	ELECT	22uF	20% 63V	
C928	1-124-572-11	ELECT	100uF	20% 63V	
C929	1-126-103-11	ELECT	470uF	20% 16V	
C930	1-124-907-11	ELECT	10uF	20% 50V	
C931	1-136-153-00	FILM	0.01uF	5% 50V	
C932	1-136-153-00	FILM	0.01uF	5% 50V	
C933	1-164-159-11	CERAMIC	0.1uF	50V	
C934	1-164-159-11	CERAMIC	0.1uF	50V	
C950	1-164-159-11	CERAMIC	0.1uF	50V	
		< CONNECTOR >			
*CN508	1-564-708-11	PIN, CONNECTOR (SMALL TYPE) 6P			
*CN902	1-564-709-11	PIN, CONNECTOR (SMALL TYPE) 7P			
*CN903	1-564-341-11	PIN, CONNECTOR 7P			
*CN904	1-564-339-00	PIN, CONNECTOR 5P			
*CN905	1-564-513-11	PLUG, CONNECTOR 10P			
		< DIODE >			
D501	8-719-987-63	DIODE	1N4148M (AEP,UK,SP,JE)		
D901	8-719-987-63	DIODE	1N4148M		
D902	8-719-987-63	DIODE	1N4148M		
D903	8-719-987-63	DIODE	1N4148M		
D904	8-719-911-55	DIODE	U05G		
D905	8-719-911-55	DIODE	U05G		
D906	8-719-911-55	DIODE	U05G		
D907	8-719-911-55	DIODE	U05G		
D908	8-719-014-96	DIODE	UZP-7.5BC		
D909	8-719-200-77	DIODE	10E2N		
D910	8-719-200-77	DIODE	10E2N		
D911	8-719-911-55	DIODE	U05G		
D912	8-719-911-55	DIODE	U05G		
D913	8-719-987-63	DIODE	1N4148M		
D914	8-719-911-55	DIODE	U05G		
D915	8-719-911-55	DIODE	U05G		
D916	8-719-987-63	DIODE	1N4148M		
D917	8-719-200-77	DIODE	10E2N		
D918	8-719-200-77	DIODE	10E2N		
D919	8-719-200-77	DIODE	10E2N		
D920	8-719-200-77	DIODE	10E2N		
D921	8-719-200-77	DIODE	10E2N		

Ref.No.	Part No.	Description			Remark
		< FUSE >			
⚠F901	1-532-781-11	FUSE, MICRO (SECONDARY) (3.15A/125V)			
⚠F902	1-532-781-11	FUSE, MICRO (SECONDARY) (3.15A/125V)			
⚠F903	1-532-771-21	FUSE, MICRO (SECONDARY) (315mA/125V)			
		< IC >			
IC501	8-749-921-11	IC	GP1F32R (DIGITAL IN-1) (AEP,UK,SP,JE)		
IC502	8-749-921-11	IC	GP1F32R (DIGITAL IN/IN-2)		
IC503	8-749-921-12	IC	GP1F32T (DIGITAL OUT)		
IC504	8-759-982-03	IC	RC5532DD		
IC505	8-759-109-82	IC	UPC814C		
IC506	8-759-109-82	IC	UPC814C		
IC516	8-759-982-03	IC	RC5532DD		
IC901	8-759-504-46	IC	PQ05RF1		
IC902	8-759-929-62	IC	LM7812CT		
IC903	8-759-929-65	IC	LM7912CT		
IC904	8-759-504-46	IC	PQ05RF1		
IC905	8-759-916-14	IC	SN74HC04AN		
IC906	8-759-249-05	IC	L88R05D		
IC907	8-759-633-42	IC	M5293L		
		< JACK >			
J501	1-568-751-61	JACK, PIN (2P SHIELD TYPE) (LINE IN)			
J502	1-568-751-61	JACK, PIN (2P SHIELD TYPE) (LINE OUT)			
		< COIL >			
L501	1-410-324-11	INDUCTOR	4.7uH		
L502	1-410-324-11	INDUCTOR	4.7uH		
		< TRANSISTOR >			
Q501	8-729-140-98	TRANSISTOR	2SD773-34 (AEP,UK,SP,JE)		
Q504	8-729-900-61	TRANSISTOR	DTA114ES		
Q505	8-729-231-55	TRANSISTOR	2SC2878-AB		
Q506	8-729-231-55	TRANSISTOR	2SC2878-AB		
Q508	8-729-231-55	TRANSISTOR	2SC2878-AB		
Q509	8-729-231-55	TRANSISTOR	2SC2878-AB		
Q901	8-729-900-80	TRANSISTOR	DTC114ES		
Q902	8-729-140-98	TRANSISTOR	2SD773-34		
		< RESISTOR >			
R501	1-259-476-11	CARBON	100K	5% 1/6W	
R502	1-259-476-11	CARBON	100K	5% 1/6W	
R503	1-259-476-11	CARBON	100K	5% 1/6W	
R504	1-259-476-11	CARBON	100K	5% 1/6W	
R505	1-259-476-11	CARBON	100K	5% 1/6W	
R506	1-259-476-11	CARBON	100K	5% 1/6W	
R507	1-259-460-11	CARBON	22K	5% 1/6W (AEP,UK,SP,JE)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les components identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description				Remark
R508	1-259-460-11	CARBON	22K	5%	1/6W	(AEP,UK,SP,JE)
R509	1-259-468-11	CARBON	47K	5%	1/6W	
R510	1-259-452-11	CARBON	10K	5%	1/6W	
R511	1-215-401-11	METAL	150	1%	1/6W	
R512	1-259-468-11	CARBON	47K	5%	1/6W	
R513	1-259-464-11	CARBON	33K	5%	1/6W	
R514	1-215-445-00	METAL	10K	1%	1/6W	
R515	1-259-452-11	CARBON	10K	5%	1/6W	
R516	1-259-464-11	CARBON	33K	5%	1/6W	
R517	1-259-464-11	CARBON	33K	5%	1/6W	
R518	1-259-464-11	CARBON	33K	5%	1/6W	
R545	1-215-425-00	METAL	1.5K	1%	1/6W	
R547	1-215-425-00	METAL	1.5K	1%	1/6W	
R548	1-215-425-00	METAL	1.5K	1%	1/6W	
R549	1-215-425-00	METAL	1.5K	1%	1/6W	
R554	1-259-412-11	CARBON	220	5%	1/6W	
R555	1-259-444-11	CARBON	4.7K	5%	1/6W	
R556	1-259-444-11	CARBON	4.7K	5%	1/6W	
R557	1-259-412-11	CARBON	220	5%	1/6W	
R558	1-259-452-11	CARBON	10K	5%	1/6W	
R560	1-259-412-11	CARBON	220	5%	1/6W	
R561	1-259-444-11	CARBON	4.7K	5%	1/6W	
R562	1-259-444-11	CARBON	4.7K	5%	1/6W	
R563	1-259-412-11	CARBON	220	5%	1/6W	
R564	1-259-420-11	CARBON	470	5%	1/6W	
R565	1-259-420-11	CARBON	470	5%	1/6W	
R566	1-259-404-11	CARBON	100	5%	1/6W	
R567	1-259-404-11	CARBON	100	5%	1/6W	
R571	1-259-420-11	CARBON	470	5%	1/6W	
R572	1-259-420-11	CARBON	470	5%	1/6W	
R901	1-259-452-11	CARBON	10K	5%	1/6W	
R902	1-259-488-11	CARBON	330K	5%	1/6W	
R903	1-259-404-11	CARBON	100	5%	1/6W	
R904	1-259-444-11	CARBON	4.7K	5%	1/6W	
R905	1-259-468-11	CARBON	47K	5%	1/6W	
R906	1-259-452-11	CARBON	10K	5%	1/6W	
R907	1-259-468-11	CARBON	47K	5%	1/6W	
R908	1-259-428-11	CARBON	1K	5%	1/6W	
R909	1-259-404-11	CARBON	100	5%	1/6W	

< RELAY >

RY501	1-515-725-21	RELAY (MIC)	(AEP,UK,SP,JE)
RY901	1-515-925-11	RELAY (MUTING)	

****

Ref.No.	Part No.	Description	Remark
*	1-647-647-11	BU RELAY BOARD	
		**********	
		< CONNECTOR >	
CN200	1-750-501-21	PIN, CONNECTOR (PC BOARD) 8P	
		< SWITCH >	
S901	1-572-467-21	SWITCH, PUSH (1 KEY) (LIMIT)	

****

*	1-647-648-11	DETECTION SWITCH BOARD	
		**********	
		< SWITCH >	
S001	1-692-464-11	SWITCH, PUSH (2 KEY) (RFLCT/PROT)	

****

*	A-4649-982-A	DIGITAL BOARD, COMPLETE (US,Canadian)	
*	A-4673-139-A	DIGITAL BOARD, COMPLETE (AEP,UK,SP,JE)	
		**********	
		< CAPACITOR >	

C100	1-126-204-11	ELECT CHIP	47uF	20%	16V	
C101	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C102	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C103	1-163-097-00	CERAMIC CHIP	15PF	5%	50V	
C104	1-163-091-00	CERAMIC CHIP	8PF		50V	
C105	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C107	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C108	1-164-005-11	CERAMIC CHIP	0.47uF		25V	
C110	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C111	1-163-038-00	CERAMIC CHIP	0.1uF		25V	(US,Canadian)
C112	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C113	1-126-204-11	ELECT CHIP	47uF	20%	16V	
C114	1-126-204-11	ELECT CHIP	47uF	20%	16V	
C115	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C116	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V	(US,Canadian)
C117	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C118	1-163-038-00	CERAMIC CHIP	0.1uF		25V	(US,Canadian)
C119	1-163-038-00	CERAMIC CHIP	0.1uF		25V	(US,Canadian)
C120	1-126-206-11	ELECT CHIP	100uF	20%	6.3V	
C121	1-163-113-00	CERAMIC CHIP	68PF	5%	50V	(US,Canadian)
C122	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	(US,Canadian)
C123	1-163-038-00	CERAMIC CHIP	0.1uF		25V	(US,Canadian)
C124	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	(US,Canadian)
C125	1-104-563-11	FILM CHIP	0.1uF	5%	16V	(US,Canadian)
C126	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C130	1-163-038-00	CERAMIC CHIP	0.1uF		25V	
C131	1-104-640-11	FILM CHIP	0.22uF	5%	16V	

DIGITAL

Ref.No.	Part No.	Description			Remark
C132	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	(US,Canadian)
C133	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C134	1-137-299-11	FILM CHIP	0.027uF	5% 16V	
C135	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C136	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C137	1-126-206-11	ELECT CHIP	100uF	20% 6.3V	(US,Canadian)
C138	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C139	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C140	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C141	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C142	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C143	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C144	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C145	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C146	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C147	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C148	1-164-161-11	CERAMIC CHIP	0.0022uF	10% 100V	
C149	1-164-161-11	CERAMIC CHIP	0.0022uF	10% 100V	
C150	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C151	1-163-141-00	CERAMIC CHIP	0.001uF	5% 50V	(US,Canadian)
C152	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C153	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C154	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C155	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C156	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C160	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C171	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C185	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C187	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C191	1-163-133-00	CERAMIC CHIP	470PF	5% 50V	
C192	1-163-121-00	CERAMIC CHIP	150PF	5% 50V	
C193	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C194	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C196	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C197	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C201	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	(AEP,UK,SP,JE)
C202	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C203	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C204	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C205	1-164-232-11	CERAMIC CHIP	0.01uF	50V	(AEP,UK,SP,JE)
C206	1-126-204-11	ELECT CHIP	47uF	20% 16V	(AEP,UK,SP,JE)
C207	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C208	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C210	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C211	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C212	1-126-204-11	ELECT CHIP	47uF	20% 16V	(AEP,UK,SP,JE)
C213	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C214	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	(AEP,UK,SP,JE)

Ref.No.	Part No.	Description			Remark
C215	1-163-091-00	CERAMIC CHIP	8PF	50V	(AEP,UK,SP,JE)
C216	1-163-091-00	CERAMIC CHIP	8PF	50V	(AEP,UK,SP,JE)
C217	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C218	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C221	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C222	1-126-204-11	ELECT CHIP	47uF	20% 16V	(AEP,UK,SP,JE)
C223	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C224	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C225	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	(AEP,UK,SP,JE)
C241	1-126-204-11	ELECT CHIP	47uF	20% 16V	(AEP,UK,SP,JE)
C242	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C243	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C244	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C245	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C246	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	(AEP,UK,SP,JE)
C261	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C262	1-126-204-11	ELECT CHIP	47uF	20% 16V	(AEP,UK,SP,JE)
C263	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C264	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C265	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C266	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C267	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C268	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	(AEP,UK,SP,JE)
C270	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C271	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C280	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C281	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C282	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C283	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C284	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C285	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C286	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C301	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C302	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C404	1-163-038-00	CERAMIC CHIP	0.1uF	25V	(AEP,UK,SP,JE)
C526	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C527	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C528	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C529	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C530	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C531	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C532	1-163-038-00	CERAMIC CHIP	0.1uF	25V	
C533	1-124-779-00	ELECT CHIP	10uF	20% 16V	
C534	1-104-551-11	FILM CHIP	0.01uF	5% 16V	
C535	1-104-551-11	FILM CHIP	0.01uF	5% 16V	
C536	1-104-551-11	FILM CHIP	0.01uF	5% 16V	
C537	1-104-551-11	FILM CHIP	0.01uF	5% 16V	
C538	1-126-204-11	ELECT CHIP	47uF	20% 16V	
C539	1-163-038-00	CERAMIC CHIP	0.1uF	25V	

Ref.No.	Part No.	Description			Remark
C541	1-163-093-00	CERAMIC CHIP 10PF	5%	50V	
C542	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C543	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C547	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C548	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C549	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C550	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C551	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C552	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C553	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C554	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C555	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C556	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C557	1-163-087-00	CERAMIC CHIP 4PF		50V	(AEP,UK,SP,JE)
C558	1-163-093-00	CERAMIC CHIP 10PF	5%	50V	(US,Canadian)
C558	1-163-087-00	CERAMIC CHIP 4PF		50V	(AEP,UK,SP,JE)
C559	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C560	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C561	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C562	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C563	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C564	1-126-204-11	ELECT CHIP 47uF	20%	16V	
C565	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C566	1-163-115-00	CERAMIC CHIP 82PF	5%	50V	
C567	1-163-115-00	CERAMIC CHIP 82PF	5%	50V	
C568	1-163-104-00	CERAMIC CHIP 30PF	5%	50V	
C569	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C571	1-163-104-00	CERAMIC CHIP 30PF	5%	50V	
C573	1-163-104-00	CERAMIC CHIP 30PF	5%	50V	
C577	1-163-104-00	CERAMIC CHIP 30PF	5%	50V	
C578	1-163-038-00	CERAMIC CHIP 0.1uF		25V	
C580	1-163-101-00	CERAMIC CHIP 22PF	5%	50V	
C584	1-163-009-11	CERAMIC CHIP 0.001uF	10%	50V	

< CONNECTOR >

CN103	1-750-491-11	PIN, CONNECTOR (PC BOARD) 3P	
*CN104	1-695-241-11	PIN, CONNECTOR (PC BOARD) 8P	
*CN105	1-750-495-11	PIN, CONNECTOR (PC BOARD) 7P	
*CN106	1-750-494-11	PIN, CONNECTOR (PC BOARD) 6P	
CN107	1-750-493-31	PIN, CONNECTOR (PC BOARD) 5P	
*CNP101	1-750-511-21	CONNECTOR, FFC/FPC 24P	
*CNP102	1-750-511-21	CONNECTOR, FFC/FPC 24P	

< DIODE >

D102	8-719-974-98	DIODE HVM17-01	(US,Canadian)
D103	8-719-016-74	DIODE 1SS352	(US,Canadian)
D104	8-719-016-74	DIODE 1SS352	
D107	8-719-016-74	DIODE 1SS352	
D502	8-719-016-74	DIODE 1SS352	
D503	8-719-016-74	DIODE 1SS352	
D504	8-719-016-74	DIODE 1SS352	
D505	8-719-016-74	DIODE 1SS352	

< IC >

IC101	8-752-365-90	IC	CXD2531BR
IC103	8-752-352-18	IC	CXD2525R
IC104	8-759-242-70	IC	TC7WU04F (US,Canadian)
IC106	8-759-177-69	IC	TLV2362ID-ELL2500 (US,Canadian)
IC109	8-759-249-85	IC	MSM514400A70SJADR1-K
IC110	8-752-363-57	IC	CXD2526AR
IC111	8-759-269-57	IC	M38067MC-070FP
IC171	8-759-187-04	IC	TC74HC365AF-TP1
IC191	8-759-083-94	IC	TC7W74FU
IC192	8-759-234-13	IC	TC4S30F
IC193	8-759-251-48	IC	uPD358GR-E1
IC210	8-759-249-06	IC	CXD8495Q (AEP,UK,SP,JE)
IC220	8-752-356-03	IC	CXD2567M (AEP,UK,SP,JE)
IC240	8-759-249-07	IC	CXD8457Q (AEP,UK,SP,JE)
IC260	8-759-196-21	IC	CXD8482Q (AEP,UK,SP,JE)
IC301	8-759-925-90	IC	SN74HC74ANS
IC302	8-759-925-76	IC	SN74HC08ANS
IC507	8-759-045-17	IC	NJM79L05UA
IC508	8-759-711-58	IC	NJM78L05UA
IC509	8-759-114-06	IC	UPC814G2-1
IC510	8-759-191-21	IC	AK5369VS-T1
IC512	8-752-359-50	IC	CXD2564AM
IC513	8-759-242-70	IC	TC7WU04F (AEP,UK,SP,JE)
IC514	8-759-711-58	IC	NJM78L05UA
IC515	8-759-982-04	IC	RC5532M

< JUMPER RESISTOR >

C579	1-216-295-00	METAL CHIP	0	5%	1/10W	
JW121	1-216-295-00	METAL CHIP	0	5%	1/10W	
JW123	1-216-295-00	METAL CHIP	0	5%	1/10W	(US,Canadian)
JW124	1-216-295-00	METAL CHIP	0	5%	1/10W	(US,Canadian)
JW125	1-216-295-00	METAL CHIP	0	5%	1/10W	(AEP,UK,SP,JE)
JW127	1-216-295-00	METAL CHIP	0	5%	1/10W	(US,Canadian)
JW128	1-216-295-00	METAL CHIP	0	5%	1/10W	(AEP,UK,SP,JE)
JW129	1-216-295-00	METAL CHIP	0	5%	1/10W	(US,Canadian)
JW130	1-216-295-00	METAL CHIP	0	5%	1/10W	(AEP,UK,SP,JE)
JW133	1-216-295-00	METAL CHIP	0	5%	1/10W	(US,Canadian)
JW201	1-216-295-00	METAL CHIP	0	5%	1/10W	
JW202	1-216-295-00	METAL CHIP	0	5%	1/10W	
JW501	1-216-295-00	METAL CHIP	0	5%	1/10W	
JW502	1-216-295-00	METAL CHIP	0	5%	1/10W	
JW579	1-216-295-00	METAL CHIP	0	5%	1/10W	(US,Canadian)

DIGITAL

Ref.No.	Part No.	Description	Remark
		< COIL >	
L102	1-412-336-41	INDUCTOR 4.7uH	
L103	1-412-332-41	INDUCTOR 2.2uH (US,Canadian)	
L104	1-412-340-31	INDUCTOR 10uH (US,Canadian)	
L105	1-412-344-31	INDUCTOR 22uH	
L107	1-412-340-31	INDUCTOR 10uH	
L108	1-412-336-41	INDUCTOR 4.7uH	
L109	1-412-336-41	INDUCTOR 4.7uH	
L150	1-543-962-21	BEAD, FERRITE (CHIP)	
L151	1-550-907-21	BEAD, FERRITE (CHIP) (US,Canadian)	
L152	1-543-962-21	BEAD, FERRITE (CHIP)	
L182	1-412-336-41	INDUCTOR 4.7uH (AEP,UK,SP,JE)	
L201	1-412-336-41	INDUCTOR 4.7uH (AEP,UK,SP,JE)	
L221	1-412-336-41	INDUCTOR 4.7uH (AEP,UK,SP,JE)	
L241	1-412-336-41	INDUCTOR 4.7uH (AEP,UK,SP,JE)	
L261	1-412-336-41	INDUCTOR 4.7uH (AEP,UK,SP,JE)	
L503	1-412-336-41	INDUCTOR 4.7uH	
L505	1-412-336-41	INDUCTOR 4.7uH	
L506	1-412-336-41	INDUCTOR 4.7uH	
L507	1-412-336-41	INDUCTOR 4.7uH	
L508	1-412-336-41	INDUCTOR 4.7uH	
L509	1-410-387-21	INDUCTOR CHIP 33uH	
		< TRANSISTOR >	
Q502	8-729-421-19	TRANSISTOR UN2213	
		< RESISTOR >	
R100	1-216-033-00	METAL CHIP 220 5% 1/10W	
R101	1-216-025-00	METAL CHIP 100 5% 1/10W	
R102	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R103	1-216-073-00	METAL CHIP 10K 5% 1/10W	(US,Canadian)
R104	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R105	1-216-025-00	METAL CHIP 100 5% 1/10W	
R106	1-216-017-00	METAL CHIP 47 5% 1/10W	
R117	1-216-121-00	METAL CHIP 1M 5% 1/10W	(US,Canadian)
R118	1-216-049-00	METAL CHIP 1K 5% 1/10W	(US,Canadian)
R119	1-216-049-00	METAL CHIP 1K 5% 1/10W	(US,Canadian)
R120	1-216-077-00	METAL CHIP 15K 5% 1/10W	(US,Canadian)
R121	1-216-077-00	METAL CHIP 15K 5% 1/10W	(US,Canadian)
R122	1-216-073-00	METAL CHIP 10K 5% 1/10W	(US,Canadian)
R123	1-216-073-00	METAL CHIP 10K 5% 1/10W	(US,Canadian)
R124	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R125	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R126	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R127	1-216-025-00	METAL CHIP 100 5% 1/10W	
R128	1-216-025-00	METAL CHIP 100 5% 1/10W	
R129	1-216-025-00	METAL CHIP 100 5% 1/10W	

Ref.No.	Part No.	Description	Remark
R130	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R131	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R132	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R133	1-216-070-00	METAL CHIP 7.5K 5% 1/10W	
R134	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R135	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R138	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R140	1-216-025-00	METAL CHIP 100 5% 1/10W	
R141	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R142	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R146	1-216-049-00	METAL CHIP 1K 5% 1/10W	(US,Canadian)
R147	1-216-045-00	METAL CHIP 680 5% 1/10W	(US,Canadian)
R148	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R149	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R150	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R151	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R153	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R154	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R155	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R156	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R157	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R158	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R159	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R164	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R167	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R168	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R169	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R170	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R171	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R172	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R173	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R174	1-216-073-00	METAL CHIP 10K 5% 1/10W	(US,Canadian)
R175	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R176	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R177	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R178	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R179	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R180	1-216-025-00	METAL CHIP 100 5% 1/10W	
R181	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R182	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R183	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R184	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R185	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R186	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R187	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R188	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R189	1-216-025-00	METAL CHIP 100 5% 1/10W	
R190	1-216-017-00	METAL CHIP 47 5% 1/10W	
R191	1-216-295-00	METAL CHIP 0 5% 1/10W	

Ref.No.	Part No.	Description				Remark
R192	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R193	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R194	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R195	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R196	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R197	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R198	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R201	1-216-085-00	METAL CHIP	33K	5%	1/10W	(AEP,UK,SP,JE)
R202	1-216-082-00	METAL GLAZE	24K	5%	1/10W	(AEP,UK,SP,JE)
R203	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	(AEP,UK,SP,JE)
R204	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	(AEP,UK,SP,JE)
R205	1-216-029-00	METAL CHIP	150	5%	1/10W	(AEP,UK,SP,JE)
R206	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R207	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R208	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R209	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R210	1-216-022-00	METAL CHIP	75	5%	1/10W	(AEP,UK,SP,JE)
R211	1-216-091-00	METAL CHIP	56K	5%	1/10W	(AEP,UK,SP,JE)
R212	1-216-022-00	METAL CHIP	75	5%	1/10W	(AEP,UK,SP,JE)
R213	1-216-091-00	METAL CHIP	56K	5%	1/10W	(AEP,UK,SP,JE)
R215	1-216-037-00	METAL CHIP	330	5%	1/10W	(AEP,UK,SP,JE)
R216	1-216-121-00	METAL CHIP	1M	5%	1/10W	(AEP,UK,SP,JE)
R221	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R222	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R223	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R224	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R225	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R226	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R227	1-216-073-00	METAL CHIP	10K	5%	1/10W	(AEP,UK,SP,JE)
R241	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R242	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R243	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R244	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R245	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R261	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R262	1-216-025-00	METAL CHIP	100	5%	1/10W	(AEP,UK,SP,JE)
R263	1-216-073-00	METAL CHIP	10K	5%	1/10W	(AEP,UK,SP,JE)
R280	1-216-025-00	METAL CHIP	100	5%	1/10W	
R281	1-216-025-00	METAL CHIP	100	5%	1/10W	
R282	1-216-025-00	METAL CHIP	100	5%	1/10W	
R501	1-216-627-11	METAL CHIP	100	0.5%	1/10W	
R502	1-216-627-11	METAL CHIP	100	0.5%	1/10W	
R519	1-216-623-11	METAL CHIP	68	0.5%	1/10W	
R520	1-216-623-11	METAL CHIP	68	0.5%	1/10W	
R521	1-216-626-11	METAL CHIP	91	1%	1/10W	
R522	1-216-603-11	METAL CHIP	10	0.5%	1/10W	
R523	1-216-611-11	METAL CHIP	22	0.5%	1/10W	
R524	1-216-611-11	METAL CHIP	22	0.5%	1/10W	
R525	1-216-626-11	METAL CHIP	91	1%	1/10W	
R526	1-216-675-11	METAL CHIP	10K	0.5%	1/10W	
R530	1-216-627-11	METAL CHIP	100	0.5%	1/10W	
R533	1-216-627-11	METAL CHIP	100	0.5%	1/10W	
R534	1-218-776-11	METAL CHIP	1M	0.50%	1/10W	(AEP,UK,SP,JE)
R535	1-216-627-11	METAL CHIP	100	0.5%	1/10W	(AEP,UK,SP,JE)
R537	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R538	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R539	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R540	1-216-687-11	METAL CHIP	33K	0.5%	1/10W	
R541	1-216-681-11	METAL CHIP	18K	0.5%	1/10W	
R542	1-216-681-11	METAL CHIP	18K	0.5%	1/10W	
R543	1-216-681-11	METAL CHIP	18K	0.5%	1/10W	
R544	1-216-681-11	METAL CHIP	18K	0.5%	1/10W	
R546	1-216-694-11	METAL CHIP	62K	0.5%	1/10W	
R550	1-216-694-11	METAL CHIP	62K	0.5%	1/10W	
R551	1-216-694-11	METAL CHIP	62K	0.5%	1/10W	
R552	1-216-694-11	METAL CHIP	62K	0.5%	1/10W	
R560	1-216-295-00	METAL CHIP	0	5%	1/10W	(AEP,UK,SP,JE)
		< VIBRATOR >				
X102	1-760-173-11	VIBRATOR, CRYSTAL (55MHz)				
X103	1-579-951-11	VIBRATOR, CERAMIC (CHIP TYPE) (6MHz)				
X201	1-579-870-21	VIBRATOR, CRYSTAL (22.5792MHz)				(AEP,UK,SP,JE)
X501	1-579-870-21	VIBRATOR, CRYSTAL (22.5792MHz)				(AEP,UK,SP,JE)
**********						
*	1-651-978-11	DISC BOARD				
		**********				
		< DIODE >				
D301	8-719-313-72	LED SEL3810A-CD (DISC)				
		< SWITCH >				
S313	1-554-303-21	SWITCH, TACTILE (⏏ EJECT)				
**********						
*	A-4649-981-A	DISP BOARD, COMPLETE (US, Canadian)				
*	A-4673-113-A	DISP BOARD, COMPLETE (AEP,UK,SP,JE)				
		**********				
*	4-963-355-01	HOLDER (FL TUBE)				
		< CAPACITOR >				
C301	1-164-159-11	CERAMIC	0.1uF		50V	
C302	1-126-154-11	ELECT	47uF	20%	6.3V	
C303	1-164-159-11	CERAMIC	0.1uF		50V	
C304	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C305	1-164-159-11	CERAMIC	0.1uF		50V	

DISP

Ref.No.	Part No.	Description			Remark
C306	1-164-159-11	CERAMIC	0.1uF		50V
C307	1-164-159-11	CERAMIC	0.1uF		50V
C308	1-164-159-11	CERAMIC	0.1uF		50V
C309	1-164-159-11	CERAMIC	0.1uF		50V
C310	1-164-159-11	CERAMIC	0.1uF		50V
C311	1-161-375-00	CERAMIC	0.0022uF	20%	50V
C312	1-161-375-00	CERAMIC	0.0022uF	20%	50V
C323	1-164-159-11	CERAMIC	0.1uF		50V
C340	1-107-818-11	DOUBLE LAYERS	1F		5.5V
C341	1-164-159-11	CERAMIC	0.1uF		50V
C342	1-126-163-11	ELECT	4.7uF	20%	50V
C343	1-161-377-00	CERAMIC	0.0047uF	20%	16V
C344	1-162-205-31	CERAMIC	18PF	5%	50V
C345	1-162-206-31	CERAMIC	20PF	5%	50V
C346	1-162-294-31	CERAMIC	0.001uF	10%	50V
C351	1-164-159-11	CERAMIC	0.1uF		50V
C352	1-164-159-11	CERAMIC	0.1uF		50V
C353	1-164-159-11	CERAMIC	0.1uF		50V
		< FLUORESCENT INDICATOR >			
FL301	1-517-242-11	INDICATOR TUBE, FLUORESCENT			
		< IC >			
IC301	8-759-259-15	IC	M38197MA-071FP		
IC302	8-749-923-11	IC	GP1U58XB		
IC303	8-759-926-06	IC	SN74HC126ANS		
IC304	8-759-512-55	IC	S-3520CF		
		< TRANSISTOR >			
Q331	8-729-900-61	TRANSISTOR	DTA114ES		
Q341	8-729-900-80	TRANSISTOR	DTC114ES		
Q342	8-729-119-76	TRANSISTOR	2SA1175-HFE		
		< RESISTOR >			
R301	1-249-429-11	CARBON	10K	5%	1/4W
R302	1-249-429-11	CARBON	10K	5%	1/4W
R304	1-249-441-11	CARBON	100K	5%	1/4W
R305	1-247-807-31	CARBON	100	5%	1/4W
R306	1-249-429-11	CARBON	10K	5%	1/4W
R307	1-249-441-11	CARBON	100K	5%	1/4W
R308	1-247-807-31	CARBON	100	5%	1/4W
R309	1-249-429-11	CARBON	10K	5%	1/4W
R310	1-249-429-11	CARBON	10K	5%	1/4W
R311	1-249-429-11	CARBON	10K	5%	1/4W
R312	1-249-425-11	CARBON	4.7K	5%	1/4W
R313	1-249-441-11	CARBON	100K	5%	1/4W
R314	1-249-429-11	CARBON	10K	5%	1/4W
R315	1-249-429-11	CARBON	10K	5%	1/4W
R316	1-249-429-11	CARBON	10K	5%	1/4W
R317	1-249-441-11	CARBON	100K	5%	1/4W

Ref.No.	Part No.	Description			Remark
R318	1-249-415-11	CARBON	680	5%	1/4W
R319	1-249-429-11	CARBON	10K	5%	1/4W
R320	1-249-429-11	CARBON	10K	5%	1/4W
R321	1-249-429-11	CARBON	10K	5%	1/4W
R322	1-249-429-11	CARBON	10K	5%	1/4W (AEP, UK, SP, JE)
R323	1-249-429-11	CARBON	10K	5%	1/4W (US, Canadian)
R331	1-249-411-11	CARBON	330	5%	1/4W
R332	1-247-807-31	CARBON	100	5%	1/4W
R333	1-247-807-31	CARBON	100	5%	1/4W
R334	1-247-807-31	CARBON	100	5%	1/4W
R335	1-247-807-31	CARBON	100	5%	1/4W
R336	1-249-415-11	CARBON	680	5%	1/4W
R343	1-249-417-11	CARBON	1K	5%	1/4W
R344	1-249-399-11	CARBON	33	5%	1/4W
R345	1-249-441-11	CARBON	100K	5%	1/4W
R353	1-247-807-31	CARBON	100	5%	1/4W
R354	1-247-807-31	CARBON	100	5%	1/4W
R355	1-247-807-31	CARBON	100	5%	1/4W
R356	1-247-807-31	CARBON	100	5%	1/4W
R357	1-247-807-31	CARBON	100	5%	1/4W
R361	1-249-429-11	CARBON	10K	5%	1/4W
R381	1-249-429-11	CARBON	10K	5%	1/4W (AEP, UK, SP, JE)
R382	1-249-429-11	CARBON	10K	5%	1/4W
R383	1-249-429-11	CARBON	10K	5%	1/4W
R384	1-249-429-11	CARBON	10K	5%	1/4W
		< COMPOSITION CIRCUIT BLOCK >			
RB301	1-233-140-11	COMPOSITION CIRCUIT BLOCK (10KX8)			
RB302	1-233-140-11	COMPOSITION CIRCUIT BLOCK (10KX8)			
RB303	1-233-140-11	COMPOSITION CIRCUIT BLOCK (10KX8)			
		< SWITCH >			
S301	1-467-601-11	ENCODER, ROTARY (⏮ AMS ⏭)			
S311	1-554-303-21	SWITCH, TACTILE (⏸)			
S312	1-554-303-21	SWITCH, TACTILE (DISPLAY)			
S314	1-554-303-21	SWITCH, TACTILE (EDIT NO)			
S315	1-554-303-21	SWITCH, TACTILE (⏩)			
S316	1-554-303-21	SWITCH, TACTILE (▶)			
S317	1-554-303-21	SWITCH, TACTILE (EDIT YES)			
S318	1-554-303-21	SWITCH, TACTILE (⏪)			
S319	1-554-303-21	SWITCH, TACTILE (● REC)			
S320	1-554-303-21	SWITCH, TACTILE (■)			
S321	1-554-303-21	SWITCH, TACTILE (REPEAT)			
S322	1-554-303-21	SWITCH, TACTILE (CLOCK SET)			
S323	1-554-303-21	SWITCH, TACTILE (PLAY MODE)			
S331	1-571-298-11	SWITCH, SLIDE (INPUT) (US, Canadian)			
S331	1-571-296-11	SWITCH, SLIDE (INPUT) (AEP, UK, SP, JE)			
S332	1-571-296-11	SWITCH, SLIDE (TIMER)			

DISP HP IN/OUT SW INTERRUPTER LOADING DRIVE MIC

Ref.No.	Part No.	Description			Remark
		< VIBRATOR >			
X301	1-579-125-11	VIBRATOR, CERAMIC (8MHz)			
X341	1-567-098-41	VIBRATOR, CRYSTAL (32.768kHz)			
**********					
*	1-651-975-11	HP BOARD			
		********			
		< CAPACITOR >			
C651	1-162-207-31	CERAMIC	22PF	5%	50V
C652	1-162-207-31	CERAMIC	22PF	5%	50V
C653	1-124-477-11	ELECT	47uF	20%	25V
C654	1-124-477-11	ELECT	47uF	20%	25V
C655	1-162-294-31	CERAMIC	0.001uF	10%	50V
C656	1-162-294-31	CERAMIC	0.001uF	10%	50V
C657	1-164-159-11	CERAMIC	0.1uF		50V
		< CONNECTOR >			
*CN651	1-564-708-11	PIN, CONNECTOR (SMALL TYPE) 6P			
		< IC >			
IC651	8-759-981-85	IC RC4556D			
		< JACK >			
J651	1-568-519-31	JACK, LARGE TYPE (PHONES)			
		< RESISTOR >			
R651	1-259-473-91	CARBON	75K	5%	1/6W
R652	1-259-473-91	CARBON	75K	5%	1/6W
R653	1-259-444-11	CARBON	4.7K	5%	1/6W
R654	1-259-468-11	CARBON	47K	5%	1/6W
R655	1-259-444-11	CARBON	4.7K	5%	1/6W
R656	1-259-468-11	CARBON	47K	5%	1/6W
R657	1-249-404-00	CARBON	82	5%	1/4W
R658	1-249-404-00	CARBON	82	5%	1/4W
		< VARIABLE RESISTOR >			
RV651	1-223-620-11	RES, VAR, CARBON 20K/20K (PHONES LEVEL)			
**********					
*	1-650-901-11	IN/OUT SW BOARD			
		**********			
		< CONNECTOR >			
CN412	1-691-992-11	PIN, CONNECTOR (PC BOARD) 3P			

Ref.No.	Part No.	Description			Remark
		< SWITCH >			
S401	1-571-300-21	SWITCH, ROTARY (IN/OUT)			
**********					
*	1-650-902-11	INTERRUPTER BOARD			
		**********			
		< IC >			
IC403	8-759-071-52	IC ON1023-S			
**********					
*	1-650-900-11	LOADING DRIVE BOARD			
		**********			
		< CAPACITOR >			
C430	1-126-204-11	ELECT CHIP	47uF	20%	16V
		< CONNECTOR >			
CN430	1-750-498-11	PIN, CONNECTOR (PC BOARD) 4P			
		< DIODE >			
D430	8-719-017-79	DIODE MA8033			
		< IC >			
IC430	8-759-636-20	IC M54641FP			
		< TRANSISTOR >			
Q430	8-729-421-19	TRANSISTOR UN2213			
**********					
*	A-4649-973-A	MIC BOARD, COMPLETE (AEP,UK,SP,JE)			
		**********			
		< CAPACITOR >			
C601	1-164-159-11	CERAMIC	0.1uF		50V
C602	1-162-294-31	CERAMIC	0.001uF	10%	50V
C603	1-162-294-31	CERAMIC	0.001uF	10%	50V
C604	1-162-294-31	CERAMIC	0.001uF	10%	50V
C605	1-162-294-31	CERAMIC	0.001uF	10%	50V
C606	1-124-791-11	ELECT	1uF	20%	100V
C607	1-124-791-11	ELECT	1uF	20%	100V
C608	1-162-294-31	CERAMIC	0.001uF	10%	50V
C609	1-162-294-31	CERAMIC	0.001uF	10%	50V
C610	1-162-294-31	CERAMIC	0.001uF	10%	50V
C611	1-124-910-11	ELECT	47uF	20%	50V
C612	1-162-294-31	CERAMIC	0.001uF	10%	50V
C613	1-124-910-11	ELECT	47uF	20%	50V
C614	1-162-199-31	CERAMIC	10PF	5%	50V
C615	1-162-199-31	CERAMIC	10PF	5%	50V

MIC OWH

Ref.No.	Part No.	Description			Remark
C616	1-124-791-11	ELECT	1uF	20% 100V	
C617	1-124-477-11	ELECT	47uF	20% 25V	
C618	1-124-477-11	ELECT	47uF	20% 25V	
C619	1-124-791-11	ELECT	1uF	20% 100V	
		< CONNECTOR >			
*CN601	1-564-711-11	PIN, CONNECTOR (SMALL TYPE) 9P			
		< DIODE >			
D601	8-719-987-63	DIODE	1N4148M		
D602	8-719-987-63	DIODE	1N4148M		
		< IC >			
IC601	8-759-982-03	IC	RC5532DD		
		< JACK >			
J601	1-764-836-11	JACK (LARGE TYPE) (MIC L MONO)			
J602	1-764-836-11	JACK (LARGE TYPE) (MIC R)			
		< RESISTOR >			
R602	1-259-436-11	CARBON	2.2K	5% 1/6W	
R603	1-259-436-11	CARBON	2.2K	5% 1/6W	
R604	1-259-460-11	CARBON	22K	5% 1/6W	
R605	1-259-420-11	CARBON	470	5% 1/6W	
R606	1-259-460-11	CARBON	22K	5% 1/6W	
R607	1-259-476-11	CARBON	100K	5% 1/6W	
R608	1-259-420-11	CARBON	470	5% 1/6W	
R609	1-259-460-11	CARBON	22K	5% 1/6W	
R610	1-259-476-11	CARBON	100K	5% 1/6W	
R612	1-259-460-11	CARBON	22K	5% 1/6W	
R613	1-259-420-11	CARBON	470	5% 1/6W	
R614	1-259-420-11	CARBON	470	5% 1/6W	
R615	1-259-444-11	CARBON	4.7K	5% 1/6W	
R616	1-259-444-11	CARBON	4.7K	5% 1/6W	
R617	1-259-487-91	CARBON	300K	5% 1/6W	
R618	1-259-487-91	CARBON	300K	5% 1/6W	
R619	1-259-476-11	CARBON	100K	5% 1/6W	
R620	1-259-476-11	CARBON	100K	5% 1/6W	
R621	1-259-404-11	CARBON	100	5% 1/6W	
R622	1-259-404-11	CARBON	100	5% 1/6W	
		< SWITCH >			
S601	1-692-906-11	SWITCH, SLIDE (MIC ATT)			

****

Ref.No.	Part No.	Description			Remark
*	A-4649-921-A	OWH BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C401	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V	
C402	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V	
C405	1-165-379-11	CERAMIC CHIP	0.0022uF	10% 500V	
C406	1-135-159-21	TANTALUM CHIP	10uF	10% 20V	
C407	1-164-336-11	CERAMIC CHIP	0.33uF	25V	
		< CONNECTOR >			
*CN401	1-695-123-11	PIN, CONNECTOR (PC BOARD) 6P			
CN403	1-750-491-11	PIN, CONNECTOR (PC BOARD) 3P			
		< DIODE >			
D401	8-719-033-60	DIODE	F1P2STP		
D402	8-719-033-60	DIODE	F1P2STP		
D403	8-719-033-60	DIODE	F1P2STP		
D404	8-719-033-60	DIODE	F1P2STP		
D405	8-719-033-60	DIODE	F1P2STP		
D406	8-719-033-60	DIODE	F1P2STP		
		< IC >			
IC401	8-759-244-73	IC	TC74ACT540F		
IC402	8-759-243-19	IC	TC7SU04F		
		< TRANSISTOR >			
Q401	8-729-017-97	TRANSISTOR	ME8P06-TE16F3		
Q402	8-729-017-97	TRANSISTOR	ME8P06-TE16F3		
Q403	8-729-017-96	TRANSISTOR	ME6N10-TE16F3		
Q404	8-729-017-96	TRANSISTOR	ME6N10-TE16F3		
		< RESISTOR >			
R401	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R402	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R403	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R404	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R405	1-216-298-00	METAL CHIP	2.2	5% 1/10W	
R406	1-216-298-00	METAL CHIP	2.2	5% 1/10W	
R407	1-216-134-00	METAL CHIP	2.2	5% 1/8W	
R408	1-216-134-00	METAL CHIP	2.2	5% 1/8W	
R409	1-216-298-00	METAL CHIP	2.2	5% 1/10W	
R410	1-216-134-00	METAL CHIP	2.2	5% 1/8W	
R411	1-216-134-00	METAL CHIP	2.2	5% 1/8W	
R412	1-216-298-00	METAL CHIP	2.2	5% 1/10W	
R413	1-216-138-00	METAL CHIP	3.3	5% 1/8W	
R414	1-216-138-00	METAL CHIP	3.3	5% 1/8W	
R415	1-216-138-00	METAL CHIP	3.3	5% 1/8W	

Ref.No.	Part No.	Description			Remark
R416	1-216-138-00	METAL CHIP	3.3	5%	1/8W
R417	1-216-049-00	METAL CHIP	1K	5%	1/10W
R418	1-216-073-00	METAL CHIP	10K	5%	1/10W
R419	1-216-049-00	METAL CHIP	1K	5%	1/10W
R420	1-216-073-00	METAL CHIP	10K	5%	1/10W
R421	1-216-073-00	METAL CHIP	10K	5%	1/10W
**********					
*	1-651-977-11	PSW BOARD			
		*********			
		< CONNECTOR >			
*CN351	1-564-338-00	PIN, CONNECTOR 4P			
		< DIODE >			
D351	8-719-313-40	LED SEL1516W (STANDBY,POWER ON)			
		< SWITCH >			
S351	1-554-303-21	SWITCH, TACTILE (POWER)			
**********					
*	A-4649-918-A	RF/SERVO BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C201	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C202	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C203	1-126-395-11	ELECT	22uF	20%	16V
C204	1-126-395-11	ELECT	22uF	20%	16V
C205	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C206	1-104-544-11	FILM CHIP	0.0027uF	5%	50V
C207	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C208	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C209	1-135-159-21	TANTALUM CHIP	10uF	10%	20V
C210	1-126-193-11	ELECT	1uF	20%	50V
C211	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C212	1-104-555-11	FILM CHIP	0.022uF	5%	16V
C213	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C214	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C215	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C216	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C217	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C218	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C219	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C220	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C221	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C222	1-126-191-11	ELECT	0.47uF	20%	50V
C223	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C224	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V

Ref.No.	Part No.	Description			Remark
C225	1-135-159-21	TANTALUM CHIP	10uF	10%	20V
C226	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C231	1-126-395-11	ELECT	22uF	20%	16V
C232	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C233	1-104-543-11	FILM CHIP	0.0022uF	5%	50V
C234	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C235	1-135-091-00	TANTALUM CHIP	1uF	20%	16V
C236	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C237	1-126-395-11	ELECT	22uF	20%	16V
C238	1-126-191-11	ELECT	0.47uF	20%	50V
C239	1-104-557-11	FILM CHIP	0.033uF	5%	16V
C240	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C241	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C242	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C243	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C244	1-126-395-11	ELECT	22uF	20%	16V
C245	1-104-640-11	FILM CHIP	0.22uF	5%	16V
C246	1-126-602-11	ELECT CHIP	3.3uF	20%	50V
C249	1-126-395-11	ELECT	22uF	20%	16V
C250	1-104-559-11	FILM CHIP	0.047uF	5%	16V
C251	1-104-563-11	FILM CHIP	0.1uF	5%	16V
C252	1-124-779-00	ELECT CHIP	10uF	20%	16V
C253	1-126-193-11	ELECT	1uF	20%	50V
C254	1-124-779-00	ELECT CHIP	10uF	20%	16V
C255	1-126-193-11	ELECT	1uF	20%	50V
C256	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C258	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C259	1-164-346-11	CERAMIC CHIP	1uF		16V
C260	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C261	1-164-346-11	CERAMIC CHIP	1uF		16V
C262	1-164-346-11	CERAMIC CHIP	1uF		16V
C263	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C265	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C266	1-164-346-11	CERAMIC CHIP	1uF		16V
C267	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C268	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C269	1-164-346-11	CERAMIC CHIP	1uF		16V
C270	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C271	1-126-395-11	ELECT	22uF	20%	16V
C272	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C273	1-164-346-11	CERAMIC CHIP	1uF		16V
C274	1-126-395-11	ELECT	22uF	20%	16V
C275	1-126-395-11	ELECT	22uF	20%	16V
C276	1-104-563-11	FILM CHIP	0.1uF	5%	16V
C278	1-126-395-11	ELECT	22uF	20%	16V
C279	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C280	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C287	1-126-193-11	ELECT	1uF	20%	50V

RF/SERVO

Ref.No.	Part No.	Description			Remark
C291	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C292	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C293	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
C294	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C295	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C296	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C299	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C450	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C451	1-126-395-11	ELECT	22uF	20%	16V
C452	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C453	1-126-395-11	ELECT	22uF	20%	16V
C454	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C455	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C456	1-104-551-11	FILM CHIP	0.01uF	5%	16V
C457	1-104-559-11	FILM CHIP	0.047uF	5%	16V
C458	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C459	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C460	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C462	1-126-395-11	ELECT	22uF	20%	16V
C463	1-126-395-11	ELECT	22uF	20%	16V
C480	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C481	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C483	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C484	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C485	1-126-191-11	ELECT	0.47uF	20%	50V
C486	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V

< CONNECTOR >

*CN201	1-695-154-11	SOCKET, CONNECTOR 18P	
*CN202	1-750-898-11	SOCKET, CONNECTOR 5P	
CN203	1-750-501-21	PIN, CONNECTOR (PC BOARD)	8P
CN204	1-750-491-11	PIN, CONNECTOR (PC BOARD)	3P
CN205	1-750-498-11	PIN, CONNECTOR (PC BOARD)	4P
*CN206	1-695-123-11	PIN, CONNECTOR (PC BOARD)	6P
CN207	1-750-279-11	CONNECTOR, FFC/FPC 24P	
CN208	1-750-279-11	CONNECTOR, FFC/FPC 24P	
CN209	1-750-500-11	PIN, CONNECTOR (PC BOARD)	7P

< DIODE >

D201	8-719-421-15	DIODE	MA8027-L
D202	8-719-016-74	DIODE	1SS352
D203	8-719-210-39	DIODE	EC10QS-04
D204	8-719-210-39	DIODE	EC10QS-04
D205	8-719-210-39	DIODE	EC10QS-04
D480	8-719-029-88	DIODE	HSM198STL

< IC >

IC201	8-752-064-34	IC	CXA1381R
IC202	8-752-057-45	IC	CXA1082BQ
IC203	8-759-084-72	IC	MPC1718FU
IC204	8-759-009-06	IC	MC14052BF
IC205	8-759-177-69	IC	TLV2362ID-ELL2500
IC206	8-759-710-79	IC	NJM2107F
IC207	8-759-300-71	IC	HD14053BFP
IC208	8-759-242-70	IC	TC7WU04F
IC209	8-759-300-71	IC	HD14053BFP
IC210	8-759-243-19	IC	TC7SU04F
IC211	8-759-822-XX	IC	L88MS05T-FA-TL
IC212	8-759-822-XX	IC	L88MS05T-FA-TL
IC213	8-759-822-XX	IC	L88MS05T-FA-TL
IC214	8-759-243-19	IC	TC7SU04F
IC215	8-759-710-79	IC	NJM2107F
IC450	8-752-064-33	IC	CXA1380N
IC480	8-759-177-69	IC	TLV2362ID-ELL2500
IC481	8-759-075-70	IC	TA75S393F

< COIL >

L201	1-216-295-00	METAL CHIP	0	5%	1/10W
L202	1-543-948-11	BEAD, FERRITE (CHIP)			
L203	1-543-948-11	BEAD, FERRITE (CHIP)			
L204	1-543-948-11	BEAD, FERRITE (CHIP)			
L206	1-543-948-11	BEAD, FERRITE (CHIP)			
L207	1-543-948-11	BEAD, FERRITE (CHIP)			
L251	1-412-039-51	INDUCTOR CHIP	100uH		
L252	1-412-039-51	INDUCTOR CHIP	100uH		
L253	1-412-039-51	INDUCTOR CHIP	100uH		
L254	1-412-039-51	INDUCTOR CHIP	100uH		
L291	1-410-380-31	INDUCTOR CHIP	8.2uH		
L450	1-412-340-31	INDUCTOR CHIP	10uH		

< TRANSISTOR >

Q201	8-729-424-08	TRANSISTOR	UN2111
Q202	8-729-120-28	TRANSISTOR	2SC1623-L5L6
Q203	8-729-101-07	TRANSISTOR	2SB798-DL
Q204	8-729-901-06	TRANSISTOR	DTA144EK
Q205	8-729-120-28	TRANSISTOR	2SC1623-L5L6
Q206	8-729-901-06	TRANSISTOR	DTA144EK
Q481	8-729-421-19	TRANSISTOR	UN2213

< RESISTOR >

R201	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R202	1-216-021-00	METAL CHIP	68	5%	1/10W
R203	1-216-028-00	METAL CHIP	130	5%	1/10W
R204	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W
R205	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W
R206	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W

Ref.No.	Part No.	Description			Remark
R207	1-216-653-11	METAL CHIP	1.2K	0.5%	1/10W
R208	1-216-085-00	METAL CHIP	33K	5%	1/10W
R209	1-216-085-00	METAL CHIP	33K	5%	1/10W
R210	1-216-085-00	METAL CHIP	33K	5%	1/10W
R211	1-216-085-00	METAL CHIP	33K	5%	1/10W
R212	1-216-085-00	METAL CHIP	33K	5%	1/10W
R213	1-216-085-00	METAL CHIP	33K	5%	1/10W
R214	1-216-085-00	METAL CHIP	33K	5%	1/10W
R215	1-216-085-00	METAL CHIP	33K	5%	1/10W
R216	1-216-085-00	METAL CHIP	33K	5%	1/10W
R217	1-216-085-00	METAL CHIP	33K	5%	1/10W
R218	1-216-697-11	METAL CHIP	82K	0.5%	1/10W
R219	1-216-699-11	METAL CHIP	100K	0.5%	1/10W
R220	1-216-661-11	METAL CHIP	2.7K	0.5%	1/10W
R221	1-216-662-11	METAL CHIP	3K	0.5%	1/10W
R222	1-216-044-00	METAL CHIP	620	5%	1/10W
R223	1-216-121-00	METAL CHIP	1M	5%	1/10W
R224	1-216-049-00	METAL CHIP	1K	5%	1/10W
R225	1-216-049-00	METAL CHIP	1K	5%	1/10W
R226	1-218-760-11	METAL CHIP	220K	0.5%	1/10W
R227	1-216-045-00	METAL CHIP	680	5%	1/10W
R228	1-216-031-00	METAL CHIP	180	5%	1/10W
R229	1-216-097-00	METAL CHIP	100K	5%	1/10W
R230	1-220-250-11	METAL CHIP	10	5%	1/2W
R231	1-218-236-91	METAL CHIP	1	10%	1/4W
R232	1-216-692-11	METAL CHIP	51K	0.5%	1/10W
R233	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R235	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R236	1-216-081-00	METAL CHIP	22K	5%	1/10W
R237	1-216-072-00	METAL CHIP	9.1K	5%	1/10W
R238	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R239	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R240	1-216-049-00	METAL CHIP	1K	5%	1/10W
R241	1-216-049-00	METAL CHIP	1K	5%	1/10W
R243	1-216-699-11	METAL CHIP	100K	0.5%	1/10W
R244	1-218-764-11	METAL CHIP	330K	0.5%	1/10W
R245	1-216-699-11	METAL CHIP	100K	0.5%	1/10W
R246	1-218-764-11	METAL CHIP	330K	0.5%	1/10W
R247	1-216-679-11	METAL CHIP	15K	0.5%	1/10W
R248	1-216-674-11	METAL CHIP	9.1K	0.5%	1/10W
R249	1-216-049-00	METAL CHIP	1K	5%	1/10W
R250	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W
R251	1-216-659-11	METAL CHIP	2.2K	0.5%	1/10W
R252	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W
R253	1-216-663-11	METAL CHIP	3.3K	0.5%	1/10W
R254	1-216-097-00	METAL CHIP	100K	5%	1/10W
R255	1-216-073-00	METAL CHIP	10K	5%	1/10W
R258	1-216-092-00	METAL CHIP	62K	5%	1/10W
R259	1-216-675-11	METAL CHIP	10K	0.5%	1/10W

Ref.No.	Part No.	Description			Remark
R260	1-216-675-11	METAL CHIP	10K	0.5%	1/10W
R261	1-216-295-00	METAL CHIP	0	5%	1/10W
R262	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R263	1-216-295-00	METAL CHIP	0	5%	1/10W
R264	1-216-081-00	METAL CHIP	22K	5%	1/10W
R265	1-216-073-00	METAL CHIP	10K	5%	1/10W
R266	1-216-693-11	METAL CHIP	56K	0.5%	1/10W
R267	1-218-758-11	METAL CHIP	180K	0.5%	1/10W
R268	1-216-668-11	METAL CHIP	5.1K	0.5%	1/10W
R269	1-216-668-11	METAL CHIP	5.1K	0.5%	1/10W
R270	1-216-121-00	METAL CHIP	1M	5%	1/10W
R272	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R273	1-218-754-11	METAL CHIP	120K	0.5%	1/10W
R274	1-218-769-11	METAL CHIP	510K	0.5%	1/10W
R275	1-216-683-11	METAL CHIP	22K	0.5%	1/10W
R276	1-216-672-11	METAL CHIP	7.5K	0.5%	1/10W
R277	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R278	1-216-697-11	METAL CHIP	82K	0.5%	1/10W
R279	1-216-690-11	METAL CHIP	43K	0.5%	1/10W
R280	1-216-693-11	METAL CHIP	56K	0.5%	1/10W
R281	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R282	1-216-295-00	METAL CHIP	0	5%	1/10W
R283	1-216-295-00	METAL CHIP	0	5%	1/10W
R284	1-216-295-00	METAL CHIP	0	5%	1/10W
R285	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R286	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R287	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R288	1-216-675-11	METAL CHIP	10K	0.5%	1/10W
R291	1-216-049-00	METAL CHIP	1K	5%	1/10W
R292	1-216-121-00	METAL CHIP	1M	5%	1/10W
R293	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R294	1-216-667-11	METAL CHIP	4.7K	0.5%	1/10W
R297	1-216-097-00	METAL CHIP	100K	5%	1/10W
R450	1-216-121-00	METAL CHIP	1M	5%	1/10W
R451	1-216-685-11	METAL CHIP	27K	0.5%	1/10W
R452	1-218-758-11	METAL CHIP	180K	0.5%	1/10W
R453	1-216-112-00	METAL CHIP	430K	5%	1/10W
R454	1-216-121-00	METAL CHIP	1M	5%	1/10W
R456	1-218-758-11	METAL CHIP	180K	0.5%	1/10W
R480	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R481	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R482	1-216-091-00	METAL CHIP	56K	5%	1/10W
R483	1-216-697-11	METAL CHIP	82K	0.5%	1/10W
R484	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R485	1-216-668-11	METAL CHIP	5.1K	0.5%	1/10W
R486	1-216-691-11	METAL CHIP	47K	0.5%	1/10W
R487	1-216-049-00	METAL CHIP	1K	5%	1/10W
R488	1-216-073-00	METAL CHIP	10K	5%	1/10W

RF/SERVO VOL

Ref.No.	Part No.	Description	Remark
		< VARIABLE RESISTOR >	
RV201	1-241-393-21	RES, ADJ, METAL GLAZE 2.2K	
RV202	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV203	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV204	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV205	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV206	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV207	1-241-391-11	RES, ADJ, METAL GLAZE 470	
RV208	1-241-393-21	RES, ADJ, METAL GLAZE 2.2K	
RV209	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K	
RV210	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K	
RV211	1-241-394-11	RES, ADJ, METAL GLAZE 4.7K	
RV212	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
RV213	1-241-396-11	RES, ADJ, METAL GLAZE 22K	
**********			
*	1-651-974-11	VOL BOARD	
		*********	
		< CONNECTOR >	
*CN603	1-564-710-11	PIN, CONNECTOR (SMALL TYPE) 8P	
		< VARIABLE RESISTOR >	
RV601	1-223-619-11	RES, VAR, CARBON 20K/20K (REC LEVEL)	
**********			
		MISCELLANEOUS	
		************	
59	1-751-829-11	WIRE (FLAT TYPE) (24 CORE)	
⚠67	1-696-586-11	CORD, POWER (UK)	
⚠68	1-569-008-11	ADAPTER, CONVERSION 2P (SP)	
⚠69	1-558-568-21	CORD, POWER (AEP,SP)	
⚠70	1-569-007-11	ADAPTER, CONVERSION 2P (JE)	
⚠71	1-558-181-21	CORD, POWER (JE)	
⚠72	1-559-583-21	CORD, POWER (US,Canadian)	
⚠214	8-583-003-21	DEVICE, MINI DISK KMS-140B	
HR901	1-500-006-11	HEAD, OVER LIGHT	
M401	A-4660-373-A	MOTOR ASSY (LOADING)	
M901	X-4944-046-1	MOTOR ASSY (SLED)	
⚠T1	1-426-677-11	TRANSFORMER, POWER (US,Canadian)	
⚠T1	1-426-720-11	TRANSFORMER, POWER (SP,JE)	
⚠T1	1-426-721-11	TRANSFORMER, POWER (AEP,UK)	
**********			
		ACCESSORIES & PACKING MATERIALS	
		********************************	
	1-466-914-11	COMMANDER, STANDARD (RM-D1M)	
	1-558-271-11	CORD, CONNECTION (AUDIO)	
	1-574-264-11	CORD, LIGHT PLUG (AEP,UK,SP,JE)	
	3-707-584-21	COVER, BATTERY (RM-D1M)	
	3-758-491-11	MANUAL, INSTRUCTION (ENGLISH,FRENCH, SPANISH,PORTUGUESE) (AEP,UK)	
	3-758-491-21	MANUAL, INSTRUCTION (ENGLISH) (US,Canadian)	
	3-758-491-31	MANUAL, INSTRUCTION (FRENCH) (Canadian)	
	3-758-491-41	MANUAL, INSTRUCTION (GERMAN,DUTCH, SWEDISH,ITALIAN) (AEP)	
	3-758-491-51	MANUAL, INSTRUCTION (ENGLISH,FRENCH, SPAISH,CHINESE) (SP,JE)	
*	4-966-023-01	CUSHION (UPPER)	
*	4-966-024-01	CUSHION (LOWER)	
*	4-966-224-01	INDIVIDUAL CARTON	
**********			

****
HARDWARE LIST
****

#1	7-621-773-95	SCREW +B 2.6X6
#2	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S
#3	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S
#4	7-682-548-09	SCREW +BVTT 3X8 (S)
#5	7-682-544-09	SCREW +B 3X3
#6	7-685-870-09	SCREW +BVTT 3X5 (S)
#7	7-621-770-XX	SCREW +BVTT 2.6X8 (S)
#8	7-621-775-00	SCREW +B 2.6X3
#9	7-621-775-10	SCREW +B 2.6X4
#10	7-621-592-00	SCREW +K 2.6X6
#11	7-621-772-10	SCREW +B 2X4
#12	7-627-852-08	SCREW,PRECISION +P 1.7X2.5
#13	7-627-551-28	SCREW,PRECISION +P 1.4X2.5
#14	7-627-552-78	SCREW,PRECISION +P 1.7X3.5
#15	7-627-852-98	SCREW,PRECISION +P1.7X4.5TYPE3
#16	7-627-552-48	SCREW,PRECISION +P 1.7X4
#17	7-627-852-38	SCREW,PRECISION +P1.7X1.8TYPE3
#18	7-621-255-35	SCREW (2MMX5), + PWH
#19	7-621-770-67	SCREW +BVTT 2.6X6 (S)

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les components identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

9-959-262-11

Sony Corporation
Audio Group

English
94B1895-1
Printed in Japan
©1994.2
Published by Audio Sector Quality Assurance Dept.

MDS-501

SONY

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model
Singapore Model
Tourist Model

SUPPLEMENT-1

Subject:

1. Correction of test mode setting method.
2. Change of adjustment method.

Because of the correction and change as mentioned above, perform the operation of Test Mode and Electrical Adjustment following the description given by this SUPPLEMENT-1 Service Manual instead of original Service Manual.

SECTION 1
TEST MODE

1-1. TEST MODE SETTING

Connect the power cord into the AC outlet while pressing the ▶(PLAY) key and ●REC key simultaneously, then release both keys after about 3 seconds.

1-2. TEST MODE RELEASING

Disconnect the power cord from the AC outlet.

1-3. TEST MODE OPERATION

[ ] represents main operations by each key.

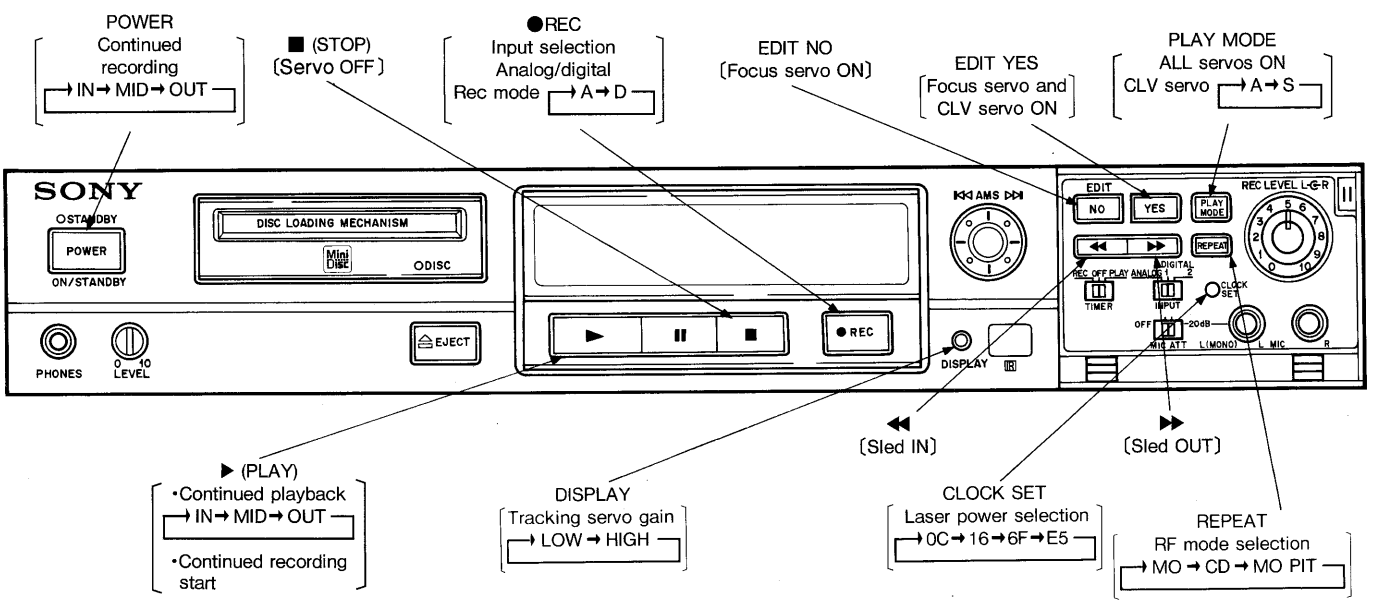


Fig. 1-1. Key arrangement

Key	Indication	Contents	Remarks
POWER	CREC-IN	Continued recording on inner circumference	• Indication changes as key is pressed. • After the indication shown in the left has appeared, repeated recording occurs at the indicated position by pressing ▶(PLAY) key. • To stop recording, press ■(STOP) key.
	CREC-MIDDLE	Continued recording on middle circumference	
	CREC-OUT	Continued recording on outer circumference	
CLOCK SET	Laser Power 0C	CD reading power	• Indication changes as key is pressed, laser power is switched and laser is emitted. • To stop the laser emission, press ■(STOP) key.
	Laser Power 16	MO reading power	
	Laser Power 6F	Laser power adjustment (3.5mV)	
	Laser Power E5	MO writing power (maximum generating power)	
DISPLAY	Trk Gain Hi	Tracking servo gain UP	• Indication changes as key is pressed, and the tracking servo gain is selected. • Normally low.
	Trk Gain Low	Tracking servo gain NORMAL	
REPEAT	RF mod=MO	RF mode : MO groove	Adjusted on the MO disc groove. • Indication changes as key is pressed, and the RF mode is selected.
	RF mod=CD	RF mode : CD	Adjusted on the CD disc.
	RF mod=MO pit	RF mode : MO pit	Adjusted on the MO disc pit.
⏏EJECT	OPEN	Disc ejection	
	CLOSE	Disc loading	
●REC	Rec mode-A	Operation mode of CXD2525R : analog	PLL master mode • Indication changes as key is pressed, and the input is selected. (analog/digital)
	Rec mode-D	Operation mode of CXD2525R : digital	PLL slave mode
◀◀	sled in	Sled is moved toward inner circumference.	• Sled moves during key is pressed, and stops when key is released.
▶▶	sled out	Sled is moved toward outer circumference.	
EDIT NO	Fcs on	Focus servo on	• Only focus servo is on by pressing key.
EDIT YES	Fcs ClvS on	Focus/spindle (S) servo on/tracking servo off	• Focus servo and spindle servo (S) are on by pressing key.
PLAY MODE	Fcs ClvATr on	Focus / spindle (A) / tracking servo on	• Indication changes as key is pressed, and each servo is on.
	Fcs ClvSTr on	Focus / spindle (S) / tracking servo on	
▶(PLAY)	C PLAY IN	Continued playback of inner circumference	• Indication changes as key is pressed, repeated recording occurs at the indicated position. • To stop the playback, press ■(STOP) key.
	C PLAY MID	Continued playback of middle circumference	
	C PLAY OUT	Continued playback of outer circumference	
■(STOP)	—	All servos off	

Table 1-1. Test mode operation

SECTION 2
ELECTRICAL ADJUSTMENTS

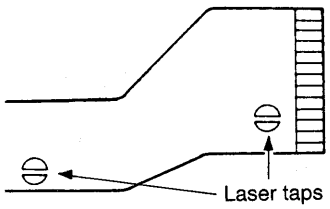
2-1. CAUTION ON LASER DIODE EMITTING CONFIRMATION

Never look the laser diode emission from right above when adjusting. It may cause loss of eyesight.

2-2. NOTE ON MiniDisc device (KMS-140B) HANDLING

The laser diode within the optical pickup is extremely subjected to electrostatic destruction. So, the laser tap on the flexible board should be bridge soldering when handling. Connect the solder bridge before disconnecting the connector. Also, do not remove the solder bridge befor connecting the connector.

There are two laser taps, and use a preferable one. Furthermore, take fully measurements against the electrostatic destruction. Take care of handling the flexible board because it can be damaged.



Optical pickup flexible board

After replacing the MiniDisc device, perform adjustment and confirmation as follows.

- Temperature compensation offset adjustment
- Laser power adjustment
- MO groove traverse adjustment
- E-F balance adjustment
- MO pit traverse adjustment
- CD RF level adjustment
- CD traverse adjustment
- Error rate confirmation

2-3. NOTE ON ADJUSTMENT

1) Perform adjustment in the test mode.
   Release the test mode after adjustment.
2) Adjustment should be performed in order described.
3) Use jigs and measurement tools described below.

- CD test disc TGYS-1 (Part No.: 4-959-188-01)
- Laser power meter LPM-8001 (Part No.: J-2501-046-A)
- Error rate counter MDPE-1 (Part No.: J-2501-047-A)
- Oscilloscope (band more than 40 MΩ, Calibrate the probe before performing the measurement.)
- Digital voltmeter
- Temperature meter

4) Take care not to allow the VC and GND to be connected internally of the oscilloscope, when plural signals are to be checked with oscilloscope. (VC and GND will be shorted.)

2-4. MO CONTINUED RECORDED DISC MAKING

- This disc is used for MO Focus Bias Adjustment and MO Error Rate Confirmation.
  The following provides how to make the MO continued recorded disc.

1. Insert a standard product MO disc (blank disc).
2. Press the REPEAT key to let "RF mod=MO" appear.
   (RF mode : MO groove)
3. Press the ▶▶key to move the optical pickup from pit to outer circumference.
4. Press the POWER key to let "CREC-MIDDLE" appear. (middle circumference continued recording)
5. Press the ▶(PLAY) key to start recording. (End the recording within five minutes.)
6. Press the ■(STOP) key to stop the recording.
7. Press the ⏏EJECT key to take out the MO disc.

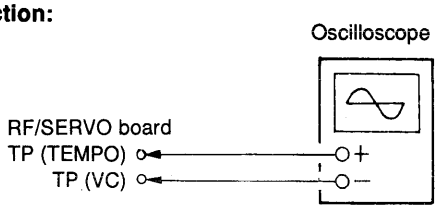
Performing these steps described above permits continued recorded disc for MO forcus bias adjustment and MO error rate confirmation.

2-5. OFFSET ADJUSTMENT

Note: This adjustment should be performed immediately after setting the test mode. Performing other adjustments switch the operation mode, and the correct adjustment can not be performed.

1) Temperature compensation offset adjustment

Connection:



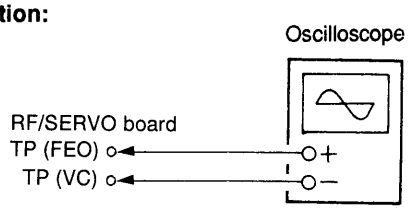
Adjustment method:

1. Connect the oscilloscope to TP (TEMPO) and TP (VC) on the RF/SERVO board.
2. Adjust RV208 on the RF/SERVO board so that the reading on the oscilloscope meets the specification.

   Specification: 0±20mV (25°C)
   +8.4mV/°C (Increased by 8.4mV with every increasing temperature by 1°C)

2) Focus bias offset adjustment

Connection:

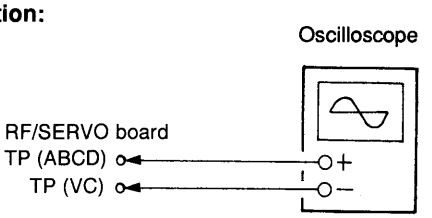


Adjustment method:

1. Connect the oscilloscope to TP (FEO) and TP (VC) on the RF/SERVO board.
2. Adjust RV206 on the RF/SERVO board so that the reading on the oscilloscope becomes −230±30mV.

3) FOK offset adjustment

Connection:

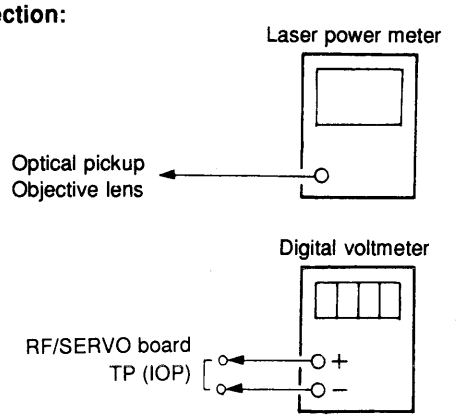


Adjustment method:

1. Connect the oscilloscope to TP (ABCD) (IC201 ㉝) and TP (VC) on the RF/SERVO board.
2. Adjust RV205 on the RF/SERVO board so that the reading on the oscilloscope becomes 0±20mV.

2-6. LASER POWER ADJUSTMENT

Connection:



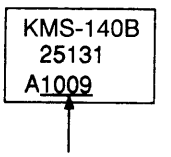
Adjustment method:

1. Place the laser power meter on the objective lens of the optical pickup. (If setting can not be made correctly, move the optical pickup using the ▶▶ or ◀◀ key.)
   Connect the digital voltmeter to TP (IOP) on the RF/SERVO board.
2. Press the CLOCK SET key to let "Laser Power 6F" appear. (laser power : for adjustment)
3. Adjust RV207 on the RF/SERVO board so that the reading on the laser power meter becomes 3.4±0.1mW.
4. Press the CLOCK SET key to let "Laser Power E5" appear. (laser power : MO writing)
5. At this time, confirm that the reading on the laser power meter, digital voltmeter meet the specifications shown below.

   Specifications:

   Laser power meter : $7.0\ ^{+0.2}_{-0.4}$ mW
   Digital voltmeter : Optical pickup reading ±3mA

   (Optical pickup label)

   In this case : Iop=100.9mA
   Iop (mA)=Digital voltmeter reading (mV) / 1(Ω)

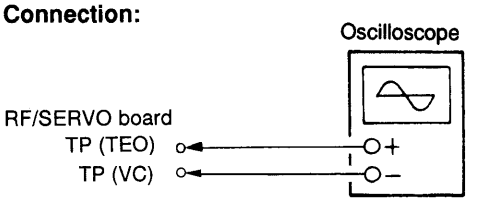
6. Press the CLOCK SET key to let "Laser Power 16" appear. (laser power : MO reading)
7. At this time, confirm that the reading on the laser power meter become the specification shown below.

   Specification :
   Laser power meter : 0.85±0.08mW

8. Press the ■(STOP) key to stop the laser emitting.

2-7. MO TRAVERSE ADJUSTMENT

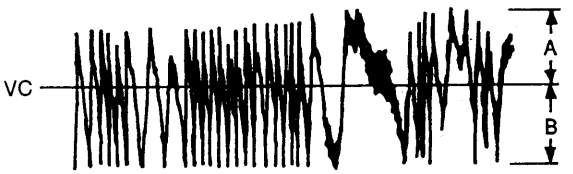
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (TEO) and TP (VC) on the RF/SERVO board.
2. Insert a MO disc (standard product).
3. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
4. Move the optical pickup from pit to outer circumference by pressing the ◀◀ or ▶▶ key.
5. Press the EDIT YES key. (Focus/spindle (S) servo on, tracking servo off)
6. Adjust the RV204 on the RF/SERVO board so that the waveform of the oscilloscope meets the specification. (MO groove traverse adjustment)

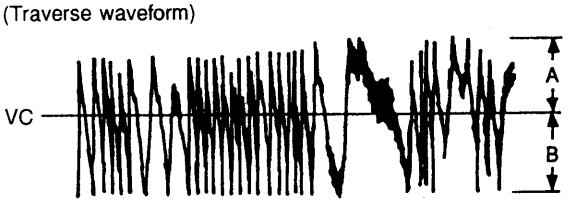
(Traverse waveform)



Specification: A=B

7. Press the CLOCK SET key to let "Laser Power E5" appear. (laser power : MO writing)
8. Adjust the RV201 on the RF/SERVO board so that the waveform of the oscilloscope meets the specification. (E-F balance adjustment)

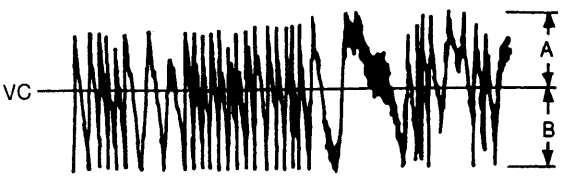
(Traverse waveform)



Specification: A=B

9. Press the CLOCK SET key to let "Laser Power 16" and "Laser Power E5" appear alternatively, and repeat adjustment until both offset values meet the specifications.
10. Press the ■(STOP) key.
11. Move the optical pickup to the pit portion (inner most circumference) by pressing ◀◀ key.
12. Press the REPEAT key to let "RF mod=MOpit" appear. (RF mode : MO Pit)
13. Press the EDIT YES key. (Focus/spindle (S) servo on, tracking servo off)
14. Adjust the RV203 on the RF/SERVO board so that the waveform of the oscilloscope meets the specification. (MO pit traverse adjustment)

(Traverse waveform)

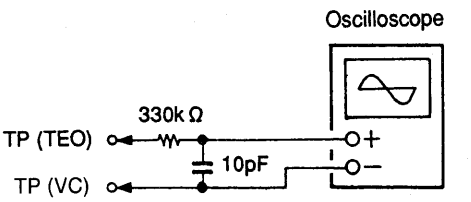


Specification: A=B

15. Press the ■(STOP) key.
16. Press the ⏏EJECT key to take out the MO disc.

Note 1: If a recorded disc is used for this adjustment, the data is erased when MO writing.

Note 2: If it is hard to observe the traverse waveform, connect the oscilloscope as shown below. The appearance is improved.

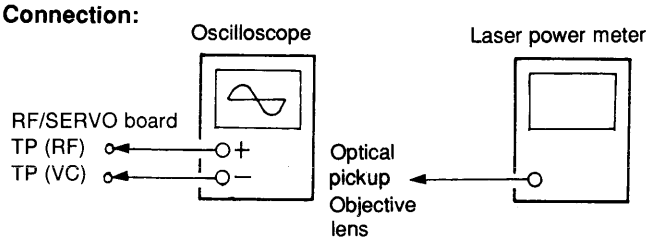


2-8. CD RF LEVEL ADJUSTMENT

Condition:

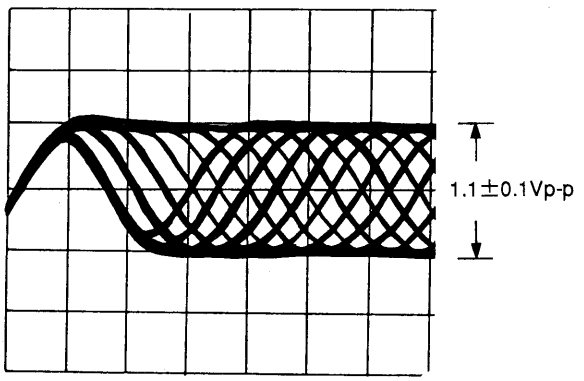
Perform adjustment in the condition where the unit is in horizontal.

Connection:



Adjustment method:

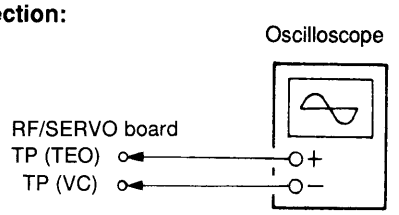
1. Connect the Oscilloscope to TP (RF) and TP (VC) on the RF/SERVO board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to perform repeated playback.
5. Adjust the RV211 on the RF/SERVO board so that the RF level of the oscilloscope becomes 1.1± 0.1Vp-p.



6. Press the ■(STOP) key to stop playback.
7. Press the ⏏EJECT key to take out the test disc.
8. Place the laser power meter on the objective lens of the optical pickup. (If setting can not be made correctly, move the optical pickup using ▶▶ or ◀◀ key.)
9. Press the CLOCK SET key to let "Laser Power 0C" appear. (laser power : CD reading)
10. Confirm that the reading of the laser power meter is 0.49±0.1mW.
11. Press the ■(STOP) key to stop laser diode emitting.

2-9. CD TRAVERSE ADJUSTMENT

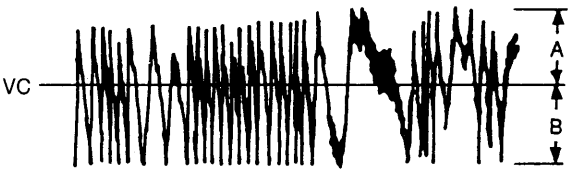
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (TEO) and TP (VC) on the RF/SERVO board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod= CD" appear. (RF mode : CD)
4. Press the EDIT YES key. (Focus/spindle (S) servo on, tracking servo off)
5. Adjust the RV202 on the RF/SERVO board so that the reading on the oscilloscope meets the specification.

(Traverse waveform)



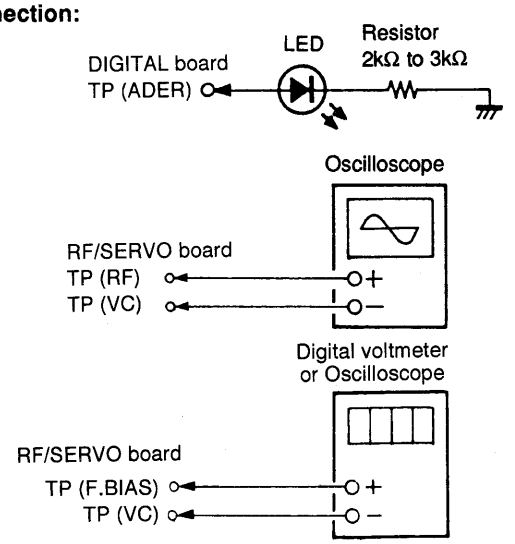
Specification: A=B

6. Press the ■(STOP) key.
7. Press the ⏏EJECT key to take out the test disc.

2-10. MO FOCUS BIAS ADJUSTMENT

● **Method by means of RF and ADER**

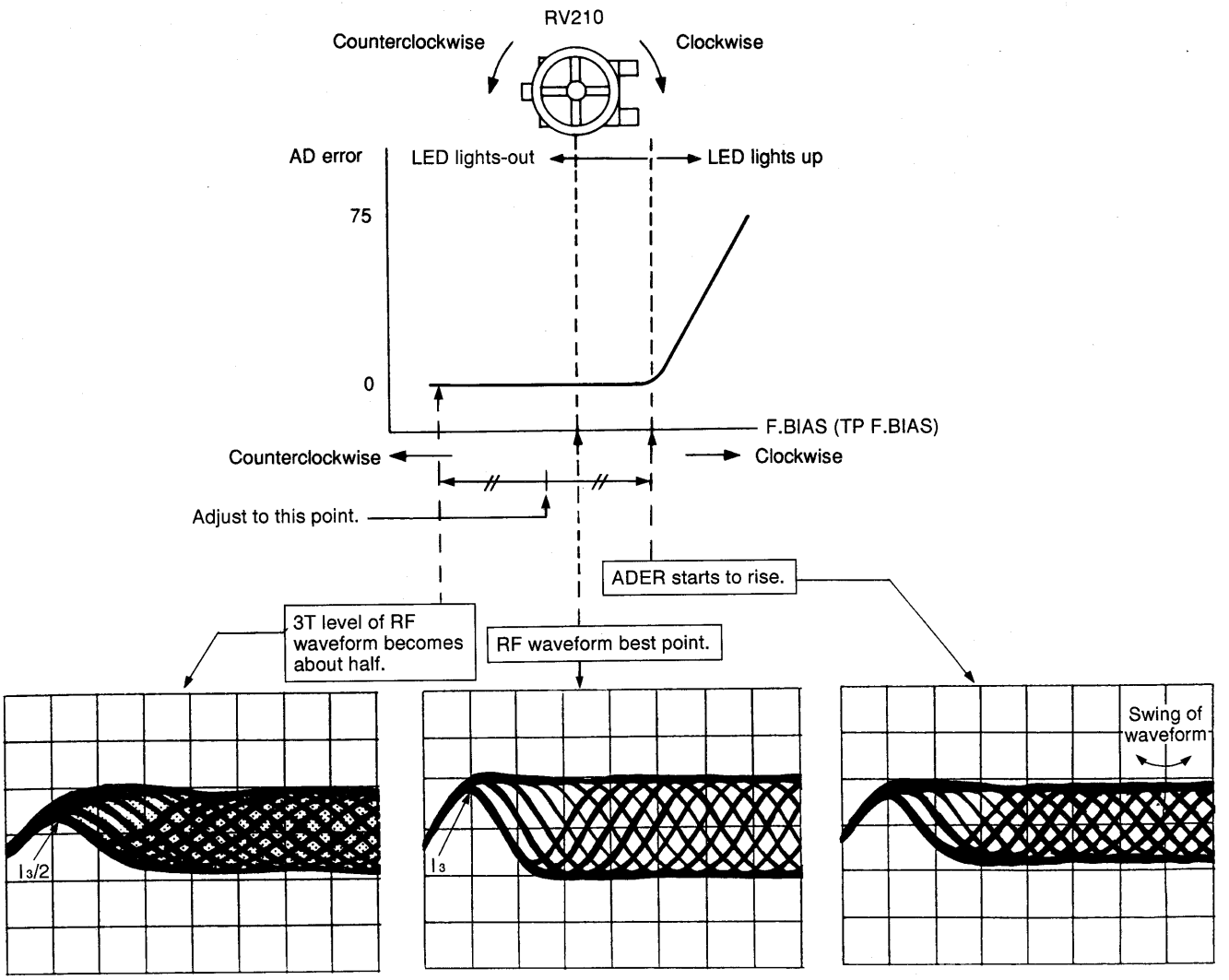
Connection:



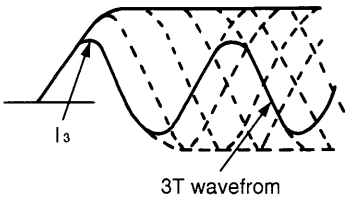
Adjustment method:

1. Connect the LED and resistor (2k to 3kΩ) to TP (ADER) on the DIGITAL board. (Oscilloscope can be connected. "H" if error is present.)
2. Connect the Oscilloscope to TP (RF) and TP (VC) on the RF/SERVO board, and also connect the digital voltmeter or oscilloscope to TP (F.BIAS) and TP (VC).
3. Insert the continued recorded disc. (Refer to "2-4. MO CONTINUED RECORDED DISC MAKING".)
4. Move the optical pickup toward outside for 1 or 2 seconds to exit from the P-TOC area.
5. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
6. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
7. Adjust the RV210 on the RF/SERVO board so that the eye-pattern of the oscilloscope correctly appears. At this time, take a note of I_3 level (3T waveform).
   (The correct eye-pattern means that ◇ shape can be identified clearly at the center of waveform.)

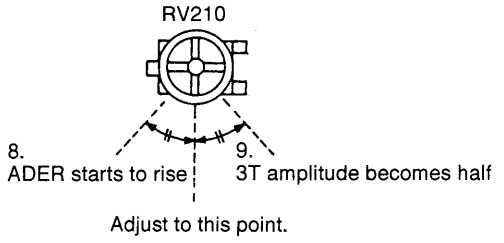
Normally, a relation between the RF waveform and AD error is as follows.



3T wavefrom



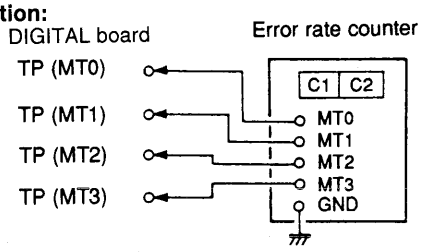
8. Observing the LED and RF waveform on oscilloscope connected to the DIGITAL board, rotate RV210 clockwise, and take a note of voltage at TP (F.BIAS) or mechanical position of RV210 when the ADER starts to rise (LED starts to blink).
9. Observing the RF waveform on oscilloscope, rotate RV210 counterclockwise, and take a note of voltage at TP (F.BIAS) or mechanical position of RV210 when the I3 level of 3T waveform recorded in step 7 becomes about half.
10. Adjust RV210 to attain center of voltage or mechanical center of those recorded in steps 8 and 9. (See Figure below.)



11. Press the ■(STOP) key to stop the playback.
12. Press the ⏏EJECT key to take out the continued recorded disc.

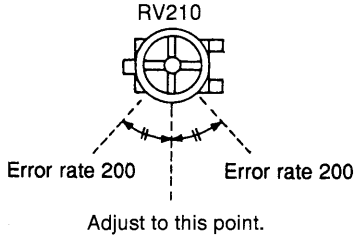
● Method requiring error rate counter

Connection:



Adjustment method:

1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the continued recorded disc. (Refer to "2-4. MO CONTINUED RECORDED DISC MAKING".)
3. Move the optical pickup toward outside for 1 or 2 seconds to exit from the TOC area.
4. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO)
5. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
6. Turn the RV210 on the RF/SERVO board so that the error rate (C1) of the error rate counter becomes 200 at two points. Measure these two points and adjust the RV210 to the mechanical center.

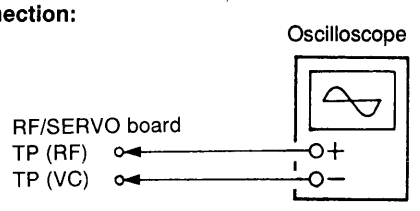


7. Press the ■(STOP) key to stop the playback.
8. Press the ⏏EJECT key to take out the continued recorded disc.

2-11. CD FOCUS BIAS ADJUSTMENT

● Method requiring no error rate counter

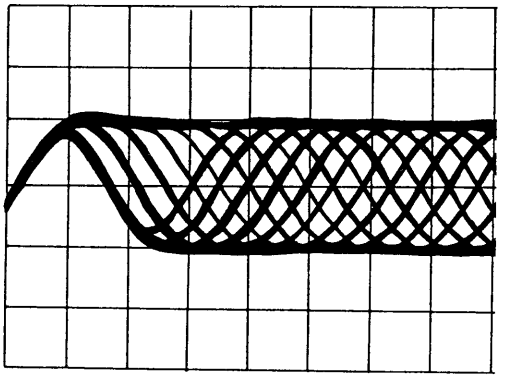
Connection:



Adjustment method:

1. Connect the Oscilloscope to TP (RF) and TP (VC) on the RF/SERVO board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to perform repeated playback.
5. Adjust the RV209 on the RF/SERVO board so that the eye-pattern of the oscilloscope correctly appears.
   (The correct eye-pattern means that ◇ shape can be identified clearly at the center of waveform.)

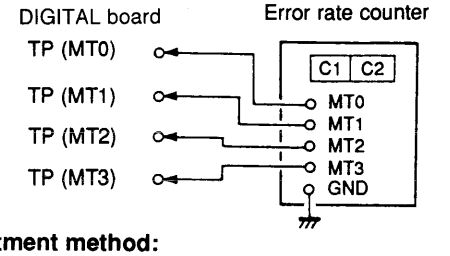
An example of RF waveform



6. Press the ■(STOP) key to stop the playback.
7. Press the ⏏EJECT key to take out the test disc.

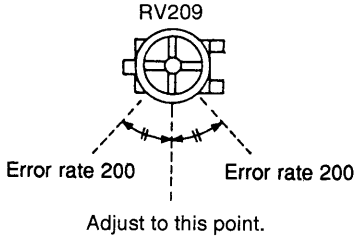
● Method requiring error rate counter

Connection:



Adjustment method:

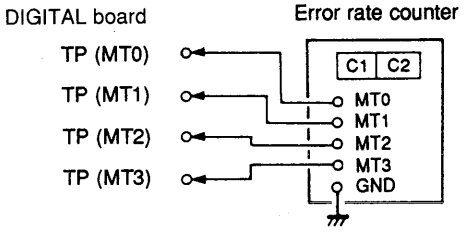
1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
5. Turn the RV209 on the RF/SERVO board so that the error rate (C1) of the error rate counter becomes 200 at two points. Measure these two points and adjust the RV209 to the mechanical center.



6. Press the ■(STOP) key to stop the playback.
7. Press the ⏏EJECT key to take out the test disc.

2-12. ERROR RATE CONFIRMATION

Connection:



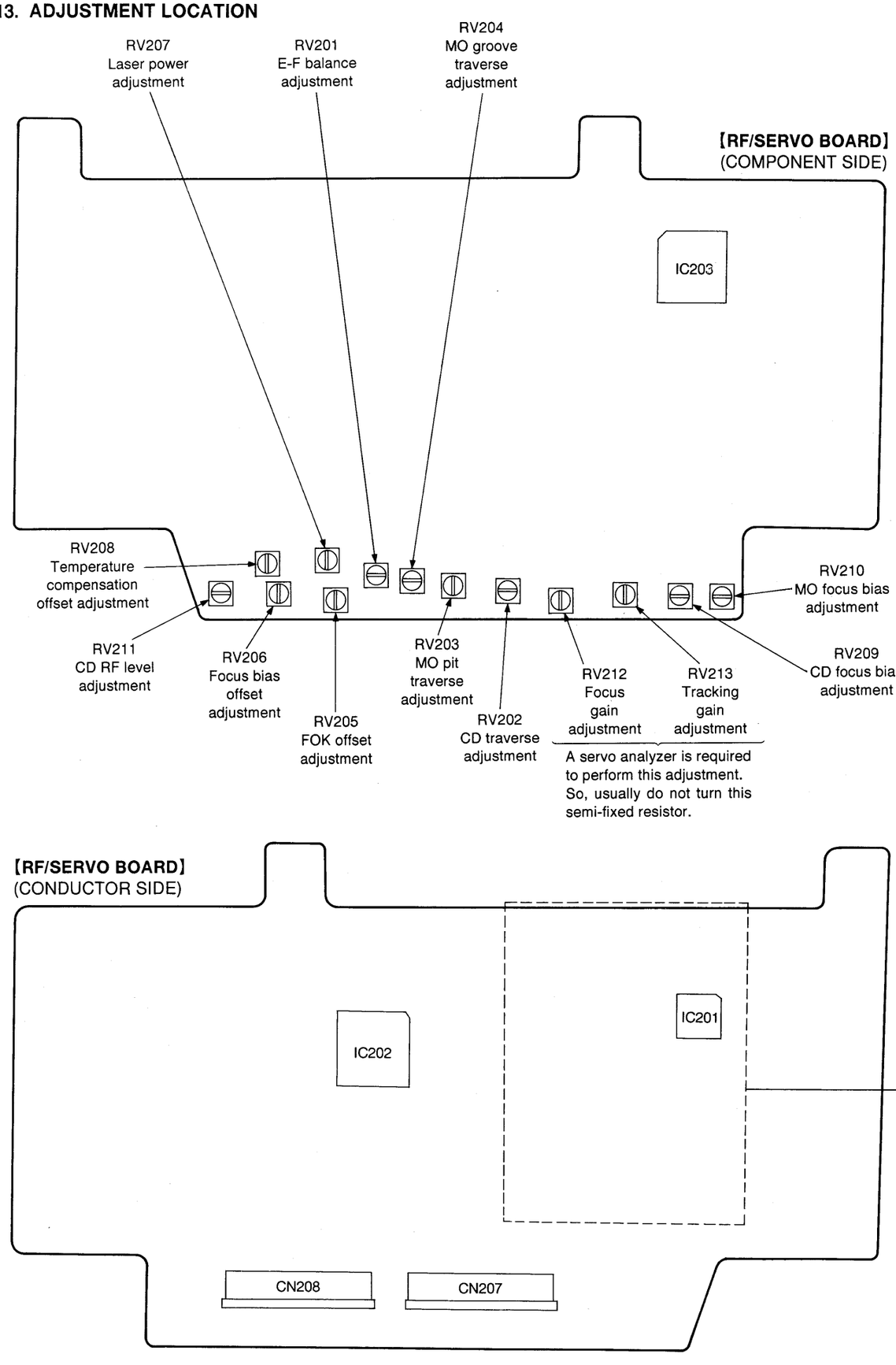
CD error rate confirmation:

1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the test disc TGYS-1.
3. Press the REPEAT key to let "RF mod=CD" appear. (RF mode : CD)
4. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference repeated playback)
5. Confirm that the error rate (C1) of the error rate counter is less than 20.
6. Press the ■(STOP) key to stop the playback.
7. Press the ⏏EJECT key to take out the tset disc.

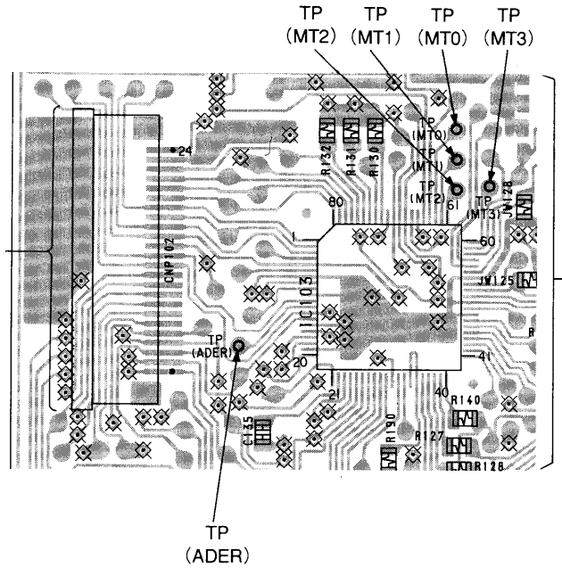
MO error rate confirmation:

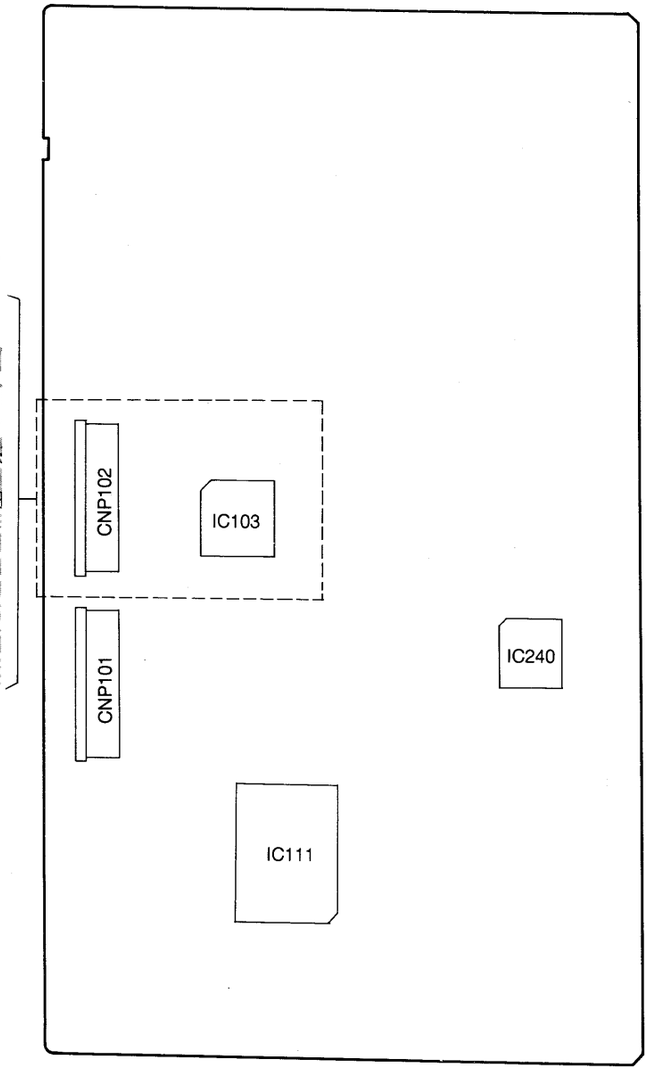
1. Connect the error rate counter to TP (MT0), TP (MT1), TP (MT2) and TP (MT3) on the DIGITAL board.
2. Insert the continued recorded disc. (Refer to "2-4. MO CONTINUED RECORDED DISC MAKING".)
3. Press the REPEAT key to let "RF mod=MO" appear. (RF mode : MO groove)
4. Press the ▶▶key to move the optical pickup from pit to outer circumference.
5. Press the ▶(PLAY) key to let "C PLAY MID" appear. (middle circumference continued playback)
6. Confirm that the error rate (C1) of the error rate counter is less than 50.
7. Press the ■(STOP) key to stop the playback.
8. Press the ⏏EJECT key to take out the continued recorded disc.

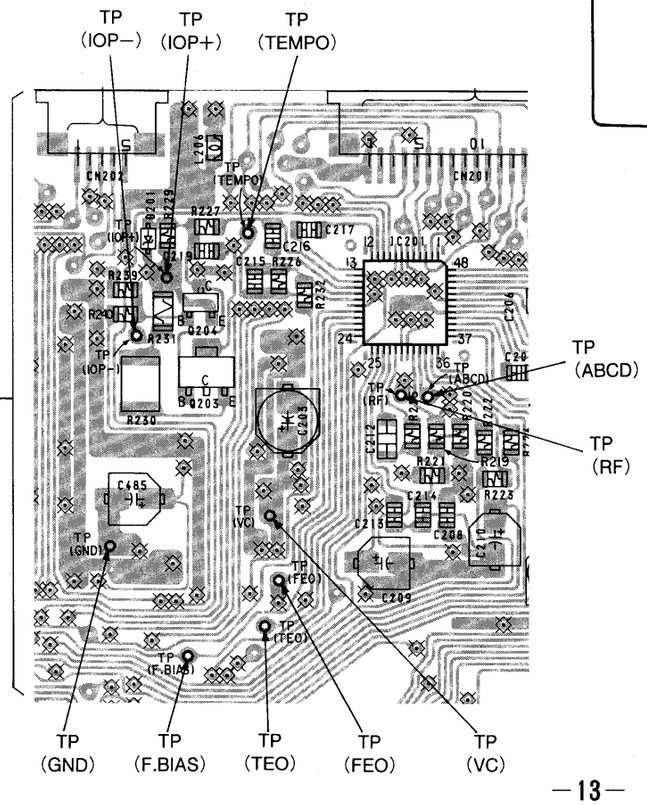
2-13. ADJUSTMENT LOCATION



【DIGITAL BOARD】 (COMPONENT SIDE)







Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

9-959-262-82

English
94E1895-1
Printed in Japan
©1994.5
Published by Home A&V Products Div. Quality Engineering Dept.